

# COMPUTERWORLD

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## PC DBMS fracas set to erupt

BY DOUGLAS BARNEY  
CW STAFF

Ashton-Tate Corp. Chairman Ed Esber has called it war. Others merely expect chaos.

No matter how you describe it, the personal computer data base management system market is heading for a new level of

functionality, confusion and competition, all because of a dizzying array of new products set to ship in the next 18 months.

This brutal competition, expected to reach a crescendo sometime next year, may mark the first real threat to Ashton-Tate's coveted lock on the market.

Recent interviews with more than a dozen large users and industry observers indicate only one clear winner in the coming data base showdown — SQL-driven data base servers. And since all key PC DBMS vendors support or plan to support SQL and the so-called client/server model — in which the server handles the processing and the workstation handles the interface — no one seems assured of victory.

### Gang's all here

A quick rundown of the coming products, none of which has shipped but all of which support SQL, includes IBM's OS/2 Extended Edition, Ashton-Tate's Dbase IV and SQL Server, which is being jointly marketed by Microsoft Corp., Sybase, Inc. and Ashton-Tate.

In addition, there are Lotus Development Corp.'s Lotus/DBMS, Oracle Corp.'s Oracle OS/2 Server, Microsoft's rumored DBMS, which uses Basic for applications work, and myriad offerings from smaller firms.

The bottom line for Ashton-Tate is this: Its unshipped SQL-compatible Dbase IV may be a make-or-break product.

"The market views Ashton-Tate as being really exposed. Their last best hope is Dbase IV," said Robert F. Petrie, a vice-president within the corporate banking sector workstation project at Manufacturers Hanover Trust Co.

That outlook foreshadows a  
*Continued on page 97*

## IBM pilot may signal net plans

BY ELISABETH HORWITT  
CW STAFF

IBM and MCI Communications Corp. are preparing to implement advanced network management and routing capabilities that may become a launchpad for IBM's networking strategy for the next decade.

The two companies are principal vendors in the renovation of the National Science Foundation's network, NSFnet, which connects researchers and scientists around the country with each other and with computing resources at the foundation's 13 Supercomputing Centers.

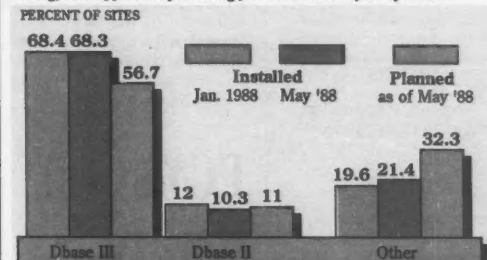
Phase 1 of the project, which became operational last week, replaced the old 56K bit/sec. NSFnet with a 1.5M bit/sec. backbone of MCI T1 lines and packet switches that IBM designed for the project.

In the next phase, IBM and MCI will attempt to tie all of the network components into the centralized Network Operations Center, which is run by Ann Arbor, Mich.-based Merit, Inc. This move should enable traffic jams, outages and other problems to be quickly identified and fixed.

Dynamic reconfiguration of bandwidth is a crucial new feature for NSFnet "so that if links  
*Continued on page 16*

### Shifting currents

Ashton-Tate's dominance in PC data base management systems is ebbing, and opportunity is rising for a multitude of competitors



\* Survey base of 11,000 IBM and plug-compatible mainframe sites with at least 100 PCs  
INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.  
CW CHART

## Doubts on Aegis use in Gulf

*Iran Airbus seen as victim of too much technology*

BY JEAN S. BOZMAN  
CW STAFF

WASHINGTON, D.C. — The investigation of the destruction of an Iranian Airbus jet one week ago by the U.S.S. Vincennes has called into question the suitability of the highly computerized Aegis missile system for the close quarters of the Persian Gulf.

The Aegis system, designed as a total weapon system working from detection to kill, tracked the passenger jet shortly after takeoff and guided two missiles to it, at least one of which knocked it out of the sky and apparently killed all 290 passengers and crew members aboard. The incident has raised a host of unanswered questions about the

reliability of the ship defense system, touted by the Navy as "the most capable surface-launched missile system the Navy has ever put to sea."

"The computer can't solve anything if it doesn't have high-  
*Continued on page 6*

## Now, whose desk do we put it on?

BY JULIE PITTA  
CW STAFF

The first personal computer ever made has found a new home at the Smithsonian Institution in Washington, D.C.

The 34-year-old G15 PC bears little resemblance to the micros of today. For starters, it is nearly the size of a refrigerator. And whereas today you can buy an IBM Personal Computer clone for as little as \$800, the G15 was a major investment at a price of about \$50,000.

"Whether it's a PC or not is a matter of argument," says Harry D. Huskey, the G15's designer. "It depends on your definition."

However, the G15 was designed for a single user. It contains 250 vacuum tubes, requires  
*Continued on page 4*



Designer Huskey at the G15

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RICK YOUNG  
DATAQUEST, INC.

*See story page 8.*

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## NEWS

# Fuse fizz quells bells

*Outage leaves 35,000 phoneless west of Boston*

BY JAMES DALY  
CW STAFF

FRAMINGHAM, Mass. — A power loss in a telecommunications switching office just minutes before the workday began jarred business schedules and left local authorities relying on a jury-rigged network of portable phones in several suburban towns west of Boston last week.

Roughly 35,000 customers in Framingham, Marlboro, Milford and Sudbury lost phone service when a fuse blew at 8:45 a.m. Wednesday in a New England Telephone central office switching unit, company spokeswoman Clare Silvestri said.

"The electricity was restored fairly quickly, but when the power went out of the computerized switch, a lot of reprogramming had to be done," Silvestri said.

Telephone capabilities were restored in fits and starts throughout the day as the reprogramming progressed, and service was fully restored to the area by 7 p.m.

In the meantime, local authorities and many businesses took precautionary measures. New England Telephone provided portable cellular telephones to police, fire stations and local hospitals and dozens of emergency vehicles were stationed at major intersections for quick availability.

### Banker's hours

Framingham police also advised banks to close for the day as a safeguard against robbery, since many of the alarm systems are tied into the telephone lines.

Although it was inconvenient, the incident pales when compared with the disruption caused by a recent fire in a switching station in a suburb of Chicago [CW, May 16].

The May 8 fire in a Hinsdale, Ill., central telephone office and switching station of Illinois Bell destroyed more than 150,000 long-distance, data and local voice lines and crippled telecommunications throughout northern Illinois.

## PCMs cool toward OSF plan

BY J. A. SAVAGE  
CW STAFF

While IBM plug-compatible manufacturers (PCM) monitor IBM's heartbeat with the precision of an electrocardiograph, when it comes to the Open Software Foundation (OSF), the doctor is out playing golf.

Challenging the AT&T-developed Unix operating system, IBM joined Digital Equipment Corp. and others two months ago in an effort to establish another open Unix or Unix-like operating system.

Amdahl Corp. and National Advanced Systems (NAS), the two leading PCMs, both back AT&T's Unix. More specifically, NAS backs Sun Microsystems, Inc.'s version of Unix, which includes some University of California at Berkeley Unix traits.

Neither PCM has committed to opposing the OSF; both said they will be able to support a new IBM standard with the computers they currently make. While they are monitoring the OSF's progress, there seems to be no need to hover over the patient.

The PCMs reportedly expect IBM's high-end Unix release, called AIX, to run under its VM

operating system. If this were the case, both companies would be able to port AIX with their current VM-compatible releases. Both said they expect AIX to ship in spring 1989.

The question of which standard to support is a problem for NAS, a subsidiary of National Semiconductor Corp.: The parent company's largest customers are being represented by the OSF. NAS has a comprehensive agreement with Sun for Unix development and marketing.

"Staying with Sun gives us at least a year lead in getting [a product running native Unix] out the door. If we went with OSF, it

**T**HE QUESTION of which standard to support is a problem for NAS: Its parent company's largest customers are being represented by the OSF.

would be two years late," said David Holt, director of NAS's Unix development. NAS said it expects to have the operating system available this fall.

Amdahl, which has its own version of AT&T's Unix — UTS — is taking a more cautious approach. "We're going for the largest open standard available, and that's AT&T's Unix," said Leighs Church, Amdahl's director of software management.





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# ADR offers alternative to ESA

*Roscoe reduces I/O, provides caching facility while eliminating upgrade*

BY CHARLES BABCOCK  
CW STAFF

PRINCETON, N.J. — Applied Data Research, Inc. (ADR) recently said it will give IBM mainframe users an alternative to moving to IBM's MVS/ESA operating system by offering a programming environment that provides one of the major benefits of ESA without requiring an upgrade.

A new release of ADR's Roscoe gives IBM MVS/XA customers the benefit of reduced I/O without forcing an upgrade to MVS/ESA and the TSO facility designed to work with it — IBM's Virtual Lookaside Facility, which is due out in the fourth quarter.

According to ADR officials, the caching facility that was added to Release 5.6 of Roscoe is comparable to the Lookaside Facility and can store the elements in Roscoe's library in virtual memory.

The cache makes use of what tends to be underutilized virtual memory above the 16M-byte address line of MVS/XA. The ele-

ments stored in cache are available as if they resided in the CPU's main memory.

Roscoe puts into cache the program elements that are frequently used or needed by multiple users.

ADR's Richard Specht said the I/O reduction represents 39% of total I/Os without the caching, with a comparable performance increase — a claim supported by an early Roscoe 5.6 customer.

## Fancy footwork

Dave Simkins, systems programmer at Kobacker Co., a national retailer that sells shoes through the Pickway and Shoework outlets, said his Columbus, Ohio-based firm uses routines written in the Roscoe programming language, called RPF, to let its buyers and merchants create reports and analyze statistics.

"The caching facility has benefited us greatly because we are an RPF-bound shop," Simkins said.

Without the caching, an RPF routine had to be called by a user

or application each time that it was needed, which created repetitive I/Os for Kobacker's IBM 3090 Model 180 mainframe, he said.

Although Kobacker has not measured Release 5.6 against 5.5, Simkins said, "Seen by the naked eye, the response time is a lot quicker." He said he considers an estimated 39% improvement realistic.

Release 5.6 also provides IBM DB2 application development facilities for Cobol and PL/I programmers. Developers can dynamically execute SQL commands, bind application plans and process DB2 commands from within Roscoe. Developers are able to interactively execute DB2 applications within Roscoe as well, ADR's Specht said.

## Resource hog

John K. Holohan, manager of the data base administration group at Mercantile Stores Co. in New York, said an application developer can do the same things under IBM's TSO/ISPF.

However, Holohan added, Roscoe is "less of a resource hog

than TSO."

TSO requires each user to have an individual address space, eating up resources in the system, while all Roscoe users operate within one address space, Holohan said.

"When we measured TSO, we found one TSO user takes up 1.5% to 2% of the CPU. Under Roscoe, we have close to 40 people using 10% to 15% of the CPU," he said.

Fifteen years ago, Roscoe was one of several competitors to IBM's teleprocessing monitors. Today, it is almost the only survivor among the group, which succumbed to IBM's CICS, IMS/DC and TSO. ADR maintains 1,800 active Roscoe licenses.

Also included in the release are the following:

- An application programming interface that gives users of SAS Institute, Inc.'s SAS System, Information Builders, Inc.'s Focus or Application Development Systems, Inc.'s Xpedit access to Roscoe's editing and RPF panels from within their applications.
- Additional data set facility functions that allow users to compress partitioned data sets.
- User interface enhancements that let a user copy data between split-screen areas.

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**Main Editorial Office**  
Box 9171, 375 Cochituate Road  
Framingham, MA 01701-9171  
617/879-0700

## Whose desk?

FROM PAGE 1

30A to 40A of power and uses a rotating magnetic drum for storage — the precursor to today's disk drives.

While the average PC today can store more than 500K bytes of information in memory, the G15 can store only 12K bytes, the equivalent of 3,000 numbers. It also lacks an operating system. Huskey had to design his own programming language, called Intercon, since none existed at the time he designed the G15. Information was fed through punch-paper tape.

A crate carrying the G15 PC was shipped from storage in a barn in Santa Cruz, Calif., to Washington last week.

The Smithsonian became aware of the G15's existence when Huskey, professor emeritus at the Computer Science Department at the University of California at Santa Cruz spoke at the Boston Computer Museum nearly two years ago. The museum also has a G15 in its collection.

A life-long academician, Huskey designed the PC in his spare time while serving as a professor at the University of California at Berkeley in the early '50s. He later sold the design to the Computer Division of Bendix Aviation Corp., where he moonlighted as a consultant for the PC project.

It took Bendix a year to get

the G15 into production. Like the PC of today, the G15 was designed to perform as a stand-alone unit. But that's where the similarities end.

Many of the PCs Bendix built in 1954 were sold to chemical and oil companies, which used them for engineering computations. With their hefty price tags, few were purchased.

## Manifest destiny

Building the G15 was no fluke for Huskey. He worked on a number of computer projects, including the development of the first general-purpose electronic computer — the Electronic Numeric Integrator and Calculator, or ENIAC — as part of a University of Pennsylvania research project from 1944 to 1946. Parts of that computer are on display at the Smithsonian.

The predecessor to the modern mainframe used 18,000 vacuum tubes, 250 kW of power and required a room 30- by 60-ft in size.

"You programmed a problem by putting jumper connections on the front panel," Huskey recalls. "It took a crew of five or six people two to three days to get a program onto a computer."

Huskey, who is 71, has lived long enough to see computers gain wide acceptance. He is particularly surprised at the phenomenal success of PCs.

"I can't believe how pervasive they are these days," Huskey says. "It seems everyone

## Apollo stock plummets following loss forecast

BY NELL MARGOLIS  
CW STAFF

CHELMSFORD, Mass. — Apollo Computer, Inc.'s announcement of an impending \$5 million to \$8 million second-quarter loss sent stock prices plummeting and analysts racing to erase formerly upbeat estimates late last week.

"It was clearly a big surprise — to the Street and to the company," said Gary Smaby, an analyst at Needham & Co. in Minneapolis.

"I knew there was exposure this quarter, largely because of [Apollo's] big price cuts earlier this year," said Russell Crabs, an analyst at Gartner Securities Corp. in Stamford, Conn. "But I never thought there'd be anything like this. Face it: This was a very, very weak quarter."

Apollo attributed the loss, which contrasts with net income of \$7.6 million in the company's fiscal 1987 second quarter, to two factors: a falloff in demand for current products from customers awaiting this week's announcement of an Apollo workstation line and to "the failure of our German subsidiary to meet its plan," company spokesmen said.

According to analysts, the

problem in West Germany stemmed largely from Siemens AG's purchases of substantially fewer Apollo computers than the company had expected under an agreement with the European electronics giant.

"Apollo is trying to sell a variety of good products in a booming market, and they should be able to do it," said Barry Bosak, an analyst at Eberstadt Fleming, Inc. in New York. The West German problem, he said, "could have been offset if [top U.S. administration] had known about it earlier in the game."

"The good news is that this kind of problem is solvable," Bosak added.

While the bad news from the balance sheet is largely rooted in problems particular to Apollo, Crabs said, it could also contain a warning to the workstation market at large.

"Most people's growth estimates for Apollo and the whole market were a bit overenthusiastic," Crabs said.

Apollo said it expects to report revenue of approximately \$145 million for the quarter ended July 2, a 10% jump from last year's comparable period. It said it will formally announce its second-quarter earnings later this month.

## Deal hints at personal VAX

BY STANLEY GIBSON  
CW STAFF

In an apparent foreshadowing of the introduction of Digital Equipment Corp.'s so-called "PVAX," or Personal VAX, Phoenix Technologies, Ltd. has signed a joint development and licensing agreement with DEC.

Phoenix, based in Norwood, Mass., provides BIOS systems software to makers of IBM Personal Computer clones. The agreement states that Phoenix will provide "customized versions of a variety of its systems software compatibility products for DEC's VAX family."

Several sources indicated it is likely that DEC will use Phoenix's software emulation of Microsoft Corp.'s MS-DOS operating system in the PVAX. Thus the PVAX, a single-user desktop machine that will reportedly run DEC's VMS operating system, will not include a hardware DOS coprocessor.

### Fall availability?

Opinions differed on when the PVAX will be formally announced. Predictions ranged from before the upcoming Decworld in September to the Digital Equipment Computer Users Society, or DECUS, meeting in late fall.

"By taking advantage of Phoenix's compatibility expertise, Digital will be able to offer customers a consistent and unified approach to PC compatibility for the VAX environment," said John Rose, senior group manager at DEC's personal computing systems group. Rose's statement was part of a prepared announcement of the agreement issued by Phoenix.

DEC currently offers no VAX/VMS systems that run MS-DOS in emulation, noted Stephen Widen, a DEC analyst at research firm International Data Corp. in Framingham, Mass. The announcement hints strongly that such a machine is in the offing, Widen said. DEC's Vaxmate personal computer is not a VAX but rather an Intel Corp. 80286-based machine that runs MS-DOS programs, Widen said.

Phoenix can provide the entire DOS environment on a couple of floppy disks rather than on a coprocessor board, a Phoenix spokesman said. He said Apollo Computer, Inc. uses such a coprocessor made by Phoenix in its DN/4000 workstation.

"DEC's final strategy is to put a VAX on everyone's desk and let it run DOS software for people who want to run that. If it could be a \$5,000 box and run VMS, DOS and OS/2, then that would be a potent competitor," said DEC observer Terry Shannon at CIS, Inc., a VMS software house in Braintree, Mass.

Shannon said such a system designed to use Decnet protocols on an Ethernet network will compete favorably with PCs using IBM's Micro Channel architecture.

## Perot's Postal Service contract stalled by GSA

WASHINGTON, D.C. — The simmering dispute between Electronic Data Systems Corp. (EDS) and its founder, H. Ross Perot, boiled over last week with a federal agency's suspension of a controversial U.S. Postal Service no-bid contract award to Perot's new firm.

The General Services Administration (GSA) Board of Contract Appeals suspended Perot Systems Corp.'s contract to do a 90-day, \$500,000 study of Postal Service efficiency. Under a second phase of the contract, Perot Systems was to identify and help implement savings for the Postal Service over a 10-year period and share in a portion of the savings.

Postmaster General Anthony Frank asked the U.S. Court of Appeals for the Federal Circuit to overrule the GSA board on the grounds that the GSA lacks jurisdiction over the Postal Service.

### Making changes

However, Frank acknowledged that the Postal Service will have to modify the second phase in order to answer concerns raised by congressional critics who fear it could result in exceptionally high profits for Perot.

The board upheld the protest of Washington-based consulting firm Planning Research Corp. and EDS, the computer services company that Perot founded, sold to General Motors Corp. in 1984 and left in 1986 with a three-year noncompetition agreement.

The ruling effectively stops work and payment on the first phase pending a full hearing by the GSA board next month.

### Wants bids offered

An EDS spokeswoman said the company filed its protest because it believes the contract, particularly the second phase, should be subject to competitive bids. She said EDS was not singling out Perot, noting that "we would do this with any competitor on contracts that we might want to bid on."

Perot's agreement with GM bars him from earning a profit with his new company before the end of 1989.

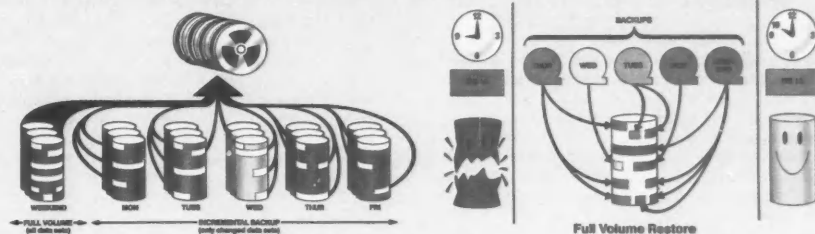
He was quoted last week as saying he now will compete directly with EDS for commercial contracts because he has been kicked around by EDS.

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# All dressed for OSI, but no way to get there

BY ELISABETH HORWITT  
CW STAFF

With the U.S. government set to impose on itself a two-year deadline to begin implementing Open Systems Interconnect (OSI), U.S. agencies — and businesses that depend on government contracts — are facing a dearth of products to ease migration from existing networks.

The big gaps are lack of OSI support by some major computer vendors and a shortage of gateways allowing OSI and Transmission Control Protocol/Internet Protocol (TCP/IP) networks to communicate during the transition period.

In the next month or two, the U.S. government and Department of Defense are slated to release mandatory guidelines for their agencies to begin migrating from TCP/IP, a de facto networking standard widely used by government agencies and contractors.

"Once the government gets its standards in place, it will impose them on contractors like us," said Wayne Hannah, director of telecommunications at McDonnell Aircraft Co.

Anticipating that scenario, the U.S. Air Force contractor has already begun implementing the "more mature" OSI protocols such as the X.400 electronic

mail system and is "pushing vendors every way we can to get on the OSI bandwagon," Hannah said.

It should take from two to five years for a full set of mature, tested, commercial OSI products to appear, Hannah said. This is the main reason why the soon-to-be-released Government OSI Protocol (GOSIP) plan and DOD OSI Implementation Strategy provide a two-year grace period in which agencies can buy either type of network, he added. After that, the agencies must specify OSI in all requests for proposals for communications systems.

"But even if someone came to us now with a full set of mature OSI products, we would not throw our existing networks out the door" without allowing them to depreciate fully, Hannah said. McDonnell Aircraft also lacks the capital to buy a new network all at once, Hannah said.

## Not plunging yet

Northrop Corp., another Air Force shop, is trying to figure out how to implement the industry networking standard on a group of hosts that currently use TCP/IP to communicate, said Nobel Mandili, an aerospace engineer at the firm. But Northrop wants to maintain at least some of its older, proven networks

while it tests the functionality of newly released OSI protocols — and while it waits for certain computer vendors to announce full support of the standard, Mandili said.

Gateways would have helped the University of Illinois' MIS in its recent efforts to tie together TCP/IP and Digital Equipment Corp. Decnet user sites, according to Virginia Metz, manager of the university's Materials Research Laboratory Center for Computation.

Instead, the organization at the university, which is a DOD and National Science Foundation (NSF) contractor, had to make do with Proteon, Inc. routers that allow devices running either protocol to coexist on the same Ethernet network. The laboratory's DEC machines still have to run TCP in order to communicate with other parts of the university.

Metz said she hopes gateways will be available to link the new networking protocols to all of the university's systems.

Not all agencies are blindly following the government's migration path, however. The NSF supports the GOSIP transition plan, "but there are lots of ways to implement OSI," said Steven Wolff, director of networking.

## Try before you buy

NSFnet, a TCP/IP-based network linking NSF sites and computer centers nationwide, last week began using a backbone that provides routing for both TCP/IP and OSI transmissions, Wolff said.

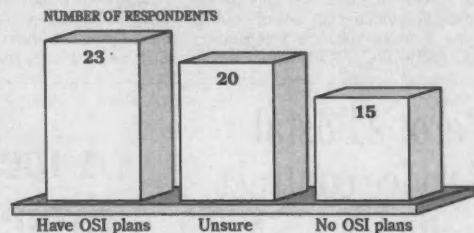
This is an early phase of the NSF migration strategy, which will allow users to try out the new OSI applications on top of their existing TCP/IP networks before migrating entirely to the industry standard, Wolff said. This strategy goes directly against GOSIP, which advocates keeping the two types of networks pure and separate, linking

Vendors are just starting to meet — and argue — about what should go into a future gateway standard, industry sources said.

During this period of debate and delay, government and defense contractors are either putting off their OSI implementation plans or making do with what is currently available. Nor-

## Divided loyalties

A survey of 58 TCP/IP users found that the majority have no plans to migrate to OSI or are uncertain



INFORMATION PROVIDED BY NEWTON-EVANS RESEARCH CO.  
CW CHART

them by means of gateways. "We do see the need for gateways — I get my X.400 mail from Europe translated into [TCP/IP E-mail protocol] SMTP all the time," Wolff said.

Right now, although a few products are beginning to appear, many vendors are letting DOD developers test the waters before they commit any research and development money on a gateway, according to Daniel Lynch, president of Advanced Computing Environments and a co-developer of TCP/IP.

Northrop, for example, is considering connecting OSI and TCP/IP systems via computers that support both protocols.

McDonnell Aircraft has been concentrating on providing a connection between users of the OSI X.400 E-mail protocol and IBM, DEC and TCP/IP E-mail users. DEC's Mailbus reportedly provides links both to X.400 and IBM's Professional Office System, better known as Profs. However, a link to the TCP/IP E-mail protocol is still unavailable, Hannah said.

## Aegis

FROM PAGE 1

quality information to begin with," said retired Adm. Eugene Carroll, deputy director of the nonprofit Center for Defense Information. In the Gulf, Carroll said, "you don't have enough time to correlate the data from the radar and the electronic sensors." The center is a nonprofit organization that provides an alternative source of defense and military analysis.

After two briefings by Assistant Secretary of Defense J. Daniel Howard last week, there was no definitive explanation on why the shipboard Aegis system displayed two identification signals from the doomed jet — one civilian and one military.

What really happened may ultimately be reconstructed from data tapes stored in the *Vincennes*' Aegis system, one of 11 such systems deployed in the U.S. Navy.

The defense system, designed to protect against potent antiship missile systems such as the Exocet missile that destroyed the UK's *HMS Sheffield* during the 1982 Falkland Islands war, is lauded by proponents as

state-of-the-art technology but has also drawn much criticism of its deployment.

At the heart of the \$525-million Aegis system is a highly sophisticated radar, the AN/Spy-1, designed to track more than 100 targets at once under severe conditions.

The radar is linked to a computerized firing system, which stores profiles of aircraft, matches them with radar signals and controls the firing of missiles. Once an aircraft is determined to be hostile, the system, either automatically or under operator control, directs a Standard-2 medium-range missile at the target, bathing it in electrons on which the missile homes in.

Although the military will not reveal classified details, military reference sources describe Aegis as controlled by three clusters of four AN/UYK-7 computer systems that direct all functions automatically.

The system, which the Navy claims allows battle coordinators "to manage rather than react to a difficult situation," detects and tracks targets, distributes data for target evaluation and designation, integrates radar and other information sources in the ship and selects and guides mis-

siles. The result is a sophisticated weapons-firing system that coordinates the firing of weapons launchers at as many as 12 moving targets.

"It is an extremely sophisticated system that has as its primary goal preventing U.S. ships from being blown out of the water," Howard said.

## Some detractors

First deployed in 1983, the Aegis system has received mixed reviews from military consultants and some critics in Congress. The General Accounting Office reported during the system's testing phase that the tests were not comprehensive enough to ensure its reliability. More recently, it has been criticized as inappropriate for use in the narrow confines of the Persian Gulf, where the Airbus was destroyed.

"Aegis was designed to support a war in the open sea, with large amounts of water and air space around the ship," Carroll said. "In the ocean, you have a measure of time to define your problems and to work out a reasoned response to the threats you are tracking."

"The problem is that it's never done nearly as well on the

open seas as the contractors promise you," Carroll continued. "At sea, you're operating with people who are less well-trained than the contractors' lab people are, and you're operating with ships rising and falling." Ultimately, all high-tech weapons systems will be judged by the feedback they give to their human operators, said Brian McCartan, a senior analyst at the Center for Defense Information. "The complexity of such systems, especially Star Wars systems, and even the explosion of NASA's *Challenger*, will be cited as evidence that these systems are just too complicated and too imperfect to give the computer the power to take control," he said.

Information processing — in a computer room or on a military ship — relies on the initial quality of the data entering the system. But in an attack, managers lack the time to check on the data's reliability, Carroll said. The *Vincennes* "only had four minutes to weigh conflicting evidence," he said. The plane was shot down while flying nine miles from the *Vincennes*.

In the July 3 shooting, an opaque haze over the Persian Gulf prevented visual contact

with the Iranian plane. The ship's system showed that the oncoming plane was descending from 9,000 feet and moving as quickly as 540 miles per hour, top speed for an Airbus.

However, a second American vessel, the U.S.S. *Sides*, reported that the jet was cruising at 12,000 feet when hit and that it was either maintaining its course or ascending at the time. Because of limited resources, there was no American Automatic Warning and Control System, or AWACS, radar plane to verify the *Vincennes*' identification of an attack plane, Howard said.

Meanwhile, the ship's radar screens could not distinguish between the 177-foot Airbus and the 62-foot F-14 fighter plane the *Vincennes*' crew reportedly believed it was firing at. "In order to make a blip twice as long as another, the second object would have to be about 16 times as large," McCartan said.

Even though the Aegis system is capable of automatically deciding to shoot down a target, *Vincennes* Capt. Will C. Rogers III made the final decision to shoot down the Iranian plane.

Washington correspondent Mitch Betts contributed to this report.

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# The mainframe print shop

BY CHARLES BABCOCK  
CW STAFF

When Connecticut Mutual Alliance informed its customers it was making a special life insurance offer, many took the company up on it, and thousands of new policies had to be generated quickly.

Until recently, the offer would have led to the hiring of 30 people, who would type up policy information on preprinted forms and then assemble by hand the 25 to 30 pages that make up a policy. This time, however, no extra staff was hired and no pre-printed forms were drawn from warehouses.

Instead, forms that reside inside a mainframe publishing system were tapped and adjusted to reflect various state regulations.

The policies were bound from the side rather than the top, allowing the contract to be opened and read more easily. And while the typical policy had previously relied on a set of endorsements that referred back into the text of a standard-issue policy, the newly issued documents read

from front to back.

"A few of the older customers were so used to the other way of doing things that they said it looked like we had gone downhill a bit. But we feel we've gained an edge on the competition," said Ralph E. Sherman, data processing officer in charge of automa-

ed policy printing at the Hartford, Conn., company.

Among a handful of companies, electronic publishing — mainframe-style — is viewed as a source of competitive advantage and a new role for the corporate MIS department. With corporations devoting 4% to 6% of their gross revenue to document printing, mainframe publishing offers the potential of scaling back or eliminating in-house print shops, said Tony Deakins, vice-president of Auxton Computer Enterprises, Inc. or Auxco, an Orlando, Fla.-based subsidiary of Cincinnati Bell, Inc. Auxco is developing a printer access system for Xerox Corp.'s mainframe publishing system.

## Active stance

"The vast majority of the Fortune 500 are studying it. The top 100 have taken measures to address it," Deakins claimed.

Several companies are already noted as innovators in the field. Earlier this year, American Express Co. started electronically printing reduced copies of customer's credit card slips on a sin-

gle sheet to back up its itemized billing, a practice that tends to reduce customer complaints, Deakins noted.

IBM established an electronic publishing business unit in Boulder, Colo., two years ago and is offering both a publishing Solutionpac and individual modules of its Master publishing series. IBM is a large user of mainframe publishing, generating one million original pages per year, which are reprinted in six billion pages of documents, said Jeff W. Mason, general manager of the new IBM unit.

## Pricey alternative

Dataquest, Inc. and other market research firms that follow the embryonic market are unable to delineate how many CPU resources are needed to support mainframe publishing compared with traditional applications like general ledger, but the cost is believed to be high.

"Nothing fills up a mainframe faster than lots of graphics and a few hundred thousand pages of text," said David H. Goodstein, president of Interconsult, Inc., a publishing consultancy in Cambridge, Mass. "IBM loves it."

Mainframe publishing is one of the few applications where a

\$35,000 to \$50,000 software package and a \$100,000 printer consume the equivalent of \$1 million worth of a mainframe, he said.

Although desktop publishing enjoys more popular support, electronic publishing is likely to become a permanent feature in many MIS shops for the following reasons:

- "The data base is on the mainframe," and key information can be extracted from it and plugged into a publishing system that prints out policies, said Frank G. Zdanowski, senior development center analyst at Lumbermen's Mutual Casualty Co.

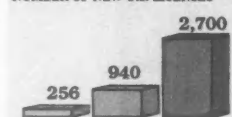
- Many authors can work on one document simultaneously in a controlled environment, and each effort can be made to conform to a corporate style, said Herman W. Prescott, vice-president of information services at SEI Information Services.

- Boeing Computer Services was able to reduce its costs for publishing software documentation from \$120 per page to \$8 per page after it established mainframe publishing, said Sharon C. Adler, who supervised the effort at its Vienna, Va., site. Adler is now with IBM's publishing unit.

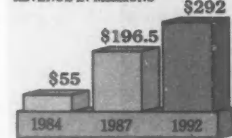
## The big picture

Dedicated mainframe publishing systems are expected to climb 23% annually through 1992 while industry revenue grows at 7.5%

NUMBER OF NEW U.S. LICENSES



REVENUE IN MILLIONS



INFORMATION PROVIDED BY  
DATAQUEST, INC.  
CW CHART

# MIS not always in control of publishing

BY JAMES A. MARTIN  
CW STAFF

At the Mattel, Inc. toy company in Hawthorne, Calif., employees in the Package Design group are putting away their yellow steno pads and pencils. From now on, the text on Mattel toy packages and the instruction booklets inside will be created and designed in-house using desktop publishing technology.

As is the case with Mattel, desktop publishing — once the renegade application brought in through the back door and largely ignored by MIS — is finally on the verge of entering the corporate computing mainstream, according to MIS and end-user computing managers.

The Mattel marketing division, for example, will be using Apple Computer, Inc. Macintosh Plus microcomputers to create, edit and publish camera-ready text and graphics that will help explain and sell products.

What is more, this desktop publishing work group will be completely integrated into Mattel's worldwide satellite data network, enabling a user in that group to communicate with any node on the network.

Despite desktop publishing's growing acceptance, MIS control over and support of desktop publishing systems still varies

widely. While some MIS departments are making it a point to develop, support and encourage desktop publishing, others continue to look the other way, often forcing users to fend for themselves.

## Past the 'gee-whiz' phase

"The honeymoon is over," said Rick Young, a senior analyst for electronic publishing at Dataquest, Inc. in San Jose, Calif. "We've gone past the 'gee-whiz' phase of desktop publishing, and now it's time to wake up and face the morning after. Now we have to decide how to work this relationship between MIS and desktop publishing out."

At Teledyne, Inc.'s Semiconductor Test Division in Los Angeles, a publications, documentation and promotions group uses the company's standard platform, Sun Microsystems, Inc.'s Sun-2 workstations, and a Unix-based publishing program to create technical manuals and other publications.

The group's Sun workstations are networked with the other Sun computers in the division as well as with its Digital Equipment Corp. VAX minicomputer, located off-site in Agoura Hills, Calif., according to Sue Hudson, marketing communications manager.

Often, raw data is pulled off

the VAX and ported to a workstation for use in either a technical manual or a graphics presentation. In addition, the publications group can communicate with any Teledyne site worldwide to exchange data and graphics. However, Hudson said software support for the publications group comes mainly from two technical writers within the group.

The MIS department at Champion International Corp. in Hamilton, Ohio, does not control the hardware and software acquisitions made by its personal computer users. As a result, users have more freedom to decide what tools they need, yet they are sometimes left to their own devices when problems occur.

Because desktop publishing represents a small fraction of the company's applications, there is no strong concern for enforcing standardization. Champion's desktop publishing efforts are minimal, confined mostly to a small group of public relations employees producing newsletters on both Macintoshes and IBM Personal Computers.

Users and analysts said desktop publishing still has hurdles to clear before it will be widely used and integrated into the corporate mainstream.

One common concern is the lack of control MIS has over the data generated by desktop publishing programs. Few, if any, packages allow for uploading files to a mainframe.

IBM's Systems Application Architecture, with its Document Content Architecture protocol, and Digital Equipment Corp.'s Digital Document Interchange Format promise to provide the kind of environment that would bring desktop publishing files into the mainstream, Dataquest's Young said.

But those architectures are still under development and are not expected to become widely available until 1990.

This means that desktop publishing as it is known today will soon die. "Desktop publishing will become, by nature, network publishing or systems publishing or corporate publishing," Young said. "Most of it will be network-oriented in the future."

# Clarix buys Nashoba Systems

BY JULIE PITTA  
CW STAFF

MOUNTAIN VIEW, Calif. — Apple Computer, Inc.'s software subsidiary, Clarix Corp., next week will announce the purchase of Foster City, Calif.-based Macintosh software developer Nashoba Systems, Inc., according to sources close to Nashoba.

The price of the acquisition remains undisclosed. Privately held Nashoba is the developer of Fileware, a data manager for the Macintosh.

Recently, the firm added Filemaker 4 to its line; the product added multiuser capabilities to

the company's line.

According to Infocorp., a Cupertino, Calif., market research firm, about 50,000 copies of Filemaker Plus and its predecessor, Filemaker for the Mac, have been shipped since they were introduced.

## Stiff competition

The acquisition of Nashoba places Clarix in direct competition with its leading third-party software developer, Microsoft Corp. Microsoft's File is the leading product in the flat file category. However, Filemaker is currently selling more briskly than the Microsoft package, ac-

cording to Infocorp.

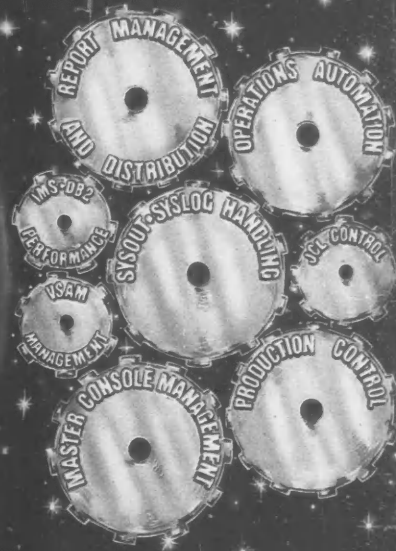
Filemaker 4 is positioned to bridge the gap between entry-level flat files such as File and more complex data base managers such as Acxis, Inc.'s Fourth Dimension for the Mac.

The purchase of Nashoba represents the second strategic acquisition for Clarix. Two weeks ago, Clarix announced the acquisition of Styleware, Inc., a Houston-based developer of software for the Apple II line of personal computers.

Nashoba was originally established in Concord, Mass., where the development team is still headquartered.



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## HP hikes prices across the board

DRAM chip costs named in 25% maximum memory add-in increases

BY JAMES A. MARTIN  
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. last week announced it will raise prices by up to 25% on its memory add-in

boards due to increased costs in dynamic random-access memory (DRAM) chips.

Effective immediately, prices on 2M- and 4M-byte add-in memory boards for HP 3000 minicomputers, including the

Micro XE, will increase 22% to 25%, the company said. Prices for HP 1000 computer memories were increased 3% to 10%, and prices went up 3% to 15% for the HP 9000 Series 300 engineering systems.

The HP 9000 Series 330 was excluded from the price increase because of a price reduction promotion.

An HP spokesman said the "drastic wholesale" price jumps on DRAMs forced the company to prop up sagging margins. Memory boards for HP's Precision Architecture systems were not included in the price increases. "We're satisfied with

the present margins there," the spokesman said.

The DRAM chip shortages have bedeviled the computer industry for months, driving up systems and board product costs and, in some cases, delaying products. HP, for example, said it postponed introducing an Intel Corp. 80386-based microcomputer at Comdex/Spring '88 because of the DRAM drought.

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## PC strippers tease DRAM board makers

The shortage in dynamic random-access memory (DRAM) chips is giving some personal computer retailers an idea: pluck the chips off add-in multifunction boards and resell them at a high markup.

Board makers said last week they have been receiving scattered reports that some of their products are being stripped of

**"WE RAISED the price to make it not economically feasible to cannibalize our boards."**

FRANK MARKS  
QUADRAM CORP.

the hard-to-get DRAM chips by retailers.

But board makers said that so far, the incidents are isolated and are not expected to become a major problem, even though the DRAM shortage will likely last through year's end.

"It's not really a widespread problem, so we can't stop anyone from doing it," said Don Williams, senior vice-president of AST Research, Inc.'s Enhancement Products Group.

But if it spreads, the plot could seriously compromise board makers' margins. "We have not marked up the RAM portion of our boards, so our margins right now are lower, and this kind of thing does hurt us," Williams said.

Quadram Corp. raised the price of its Quad 386XT accelerator board two months ago by \$300, because at the original price of \$995, others found it profitable to resell the memory chips, according to Quadram President Frank Marks.

"We determined we were not in the business of selling piece parts, so we raised the price to make it not economically feasible to cannibalize our boards," Marks said.

JAMES A. MARTIN

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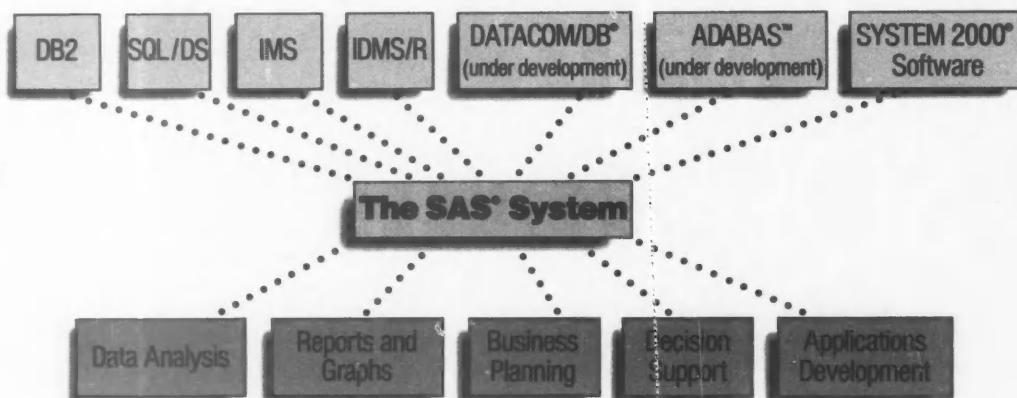
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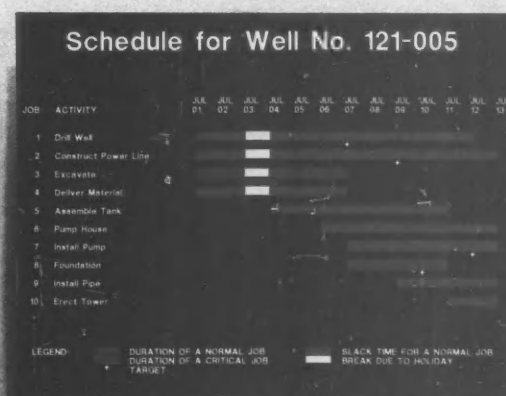
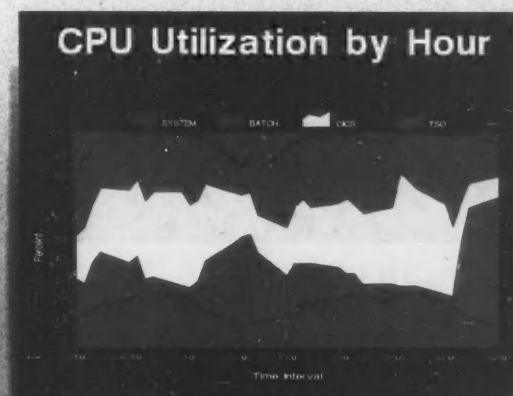
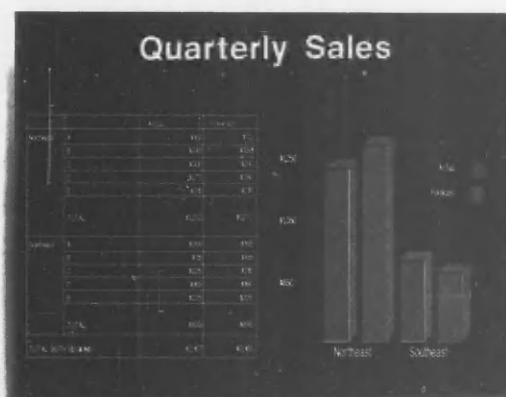
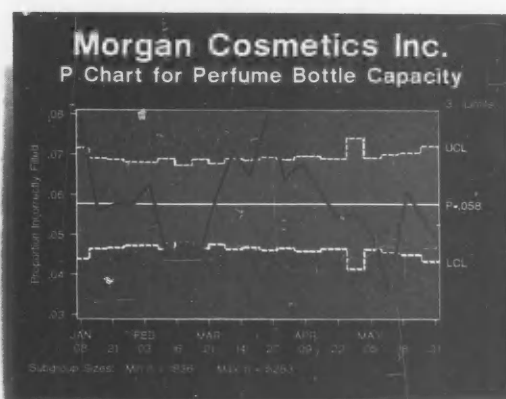
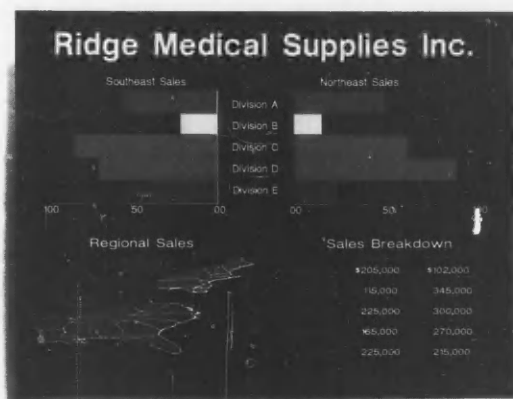
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## 3+ Share boosts server options

BY KATHY CHIN LEONG  
CW STAFF

SANTA CLARA, Calif. — 3Com Corp. is releasing an enhanced version of its 3+ operating system that is expected to give the vendor a significant boost in capturing a market previously resistant to its network offerings.

The pivotal aspect of 3+ Share 1.3.1 is its ability to use an Intel Corp. 80286- or 80386-based personal computer as the dedicated file server while running Apple Computer, Inc.'s Macintosh and other PCs on a single network using 3+ for Macintosh software.

Prior to this release, users had to buy 3Com's dedicated file server in order to mix Macintoshes and PCs.

### Looking for an edge

According to Wes Raffel, vice-president of software marketing at 3Com, the dedicated servers represented only about 20% of the company's entire installed base.

## NEC, Hitachi go at AS/400

NEC Corp. and Hitachi Ltd. have become the first Japanese computer makers to announce head-on competition for IBM's AS/400. However, both companies said last week that they have no plans at this time to sell the systems in the U.S.

Introduced last week were the NEC ACOS 3400 and the Hitachi Hitac M620. While a NEC spokesman said the 3400 competes more with IBM's 9370, a Hitachi representative positioned NEC's entry in line with the Hitac M620 and IBM's AS/400. The ACOS 3400 offers 8M to 96M bytes of main memory and is available now at monthly rental fees equivalent to \$22,308 to \$46,462.

"We had no current plans for selling the system here," said a NEC Information Systems, Inc. spokesman based in New York. "We are already selling mid-range Unix machines."

The Hitac M620 is available in three configurations and competes with the mid-range systems in the AS/400 line, the Models B20 to B40, according to the company. The Hitachi machines carry 8M to 32M bytes of main memory.

Prices range from the equivalent of \$88,461 to \$226,923, plus another \$46,153 for the operating system. Hitachi said it plans to sell 3,500 units within three years of the shipment date, which is scheduled for late September.

"Our accounts are buying Macintoshes by the droves nowadays," he said. "The support of an 80386 machine will give us an edge."

The enhanced operating system, priced at \$2,100, frees up to 200K bytes of system memo-

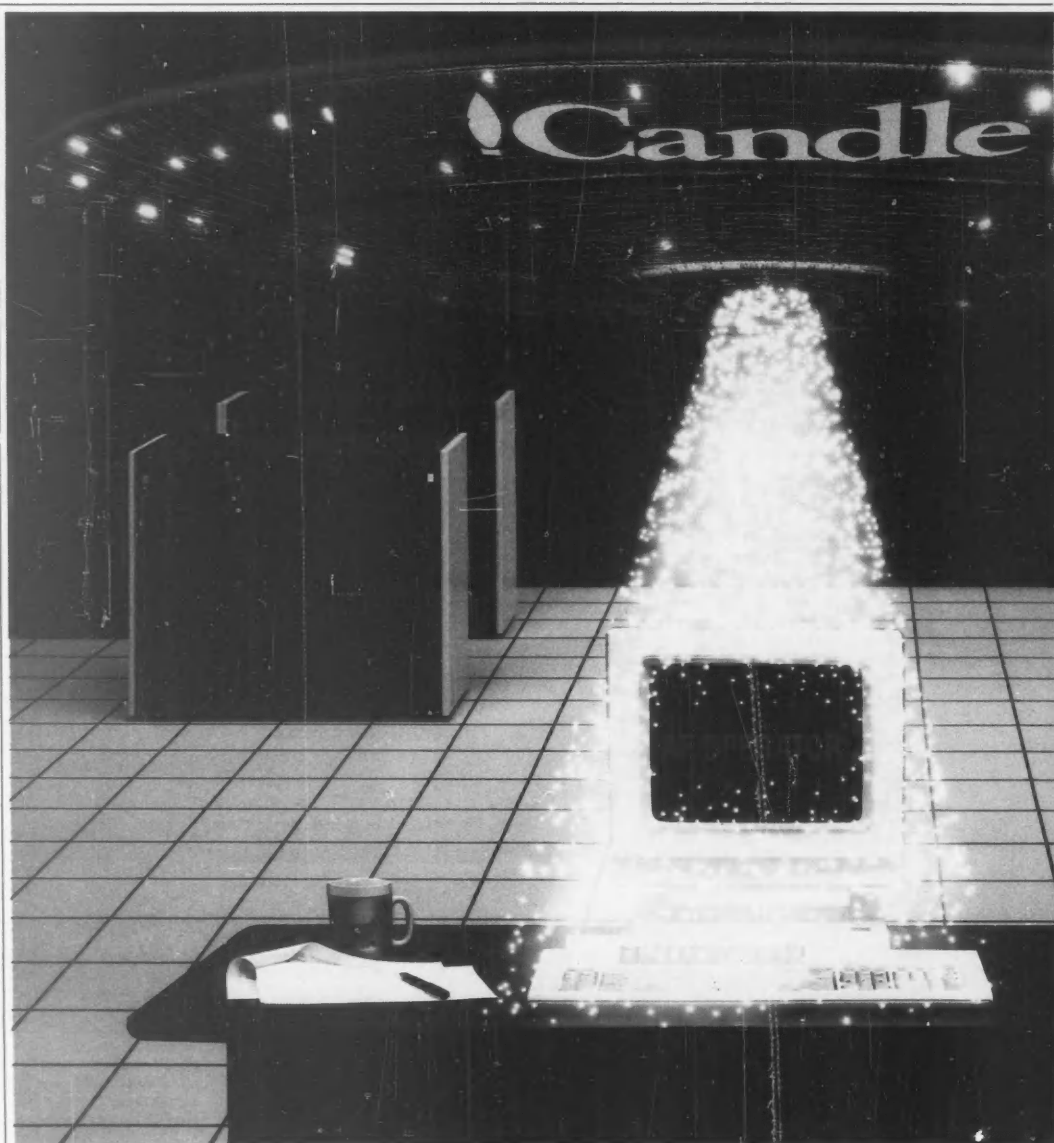
ry on 80386 machines through the use of a memory management driver that reallocates unused computer memory. This allows additional network services such as electronic mail and remote network access to sit on a single 80386-based PC.

The software has also been upgraded to support high-speed asynchronous modems, including Telebit Corp.'s Trailblazer and Hayes Microcomputer Products, Inc.'s Smartmodem 9600.

"It is definitely about time for 3Com to do something like this," said Nina Burns, an analyst at Infonetics, Inc. in Santa Clara. "Our research shows that users didn't like the fact that they had

to use a 3Com dedicated server to run their Macintoshes on a network. Many corporations have existing 80286 and 80386 machines that can be used as a file server."

Meanwhile, 3Com said it is dropping the price of its existing operating system, 3+ Share 1.2.1, by 45%. Both products will be shipping immediately, the company said.



## The Power of Automated Operations



# Distributed tools outrun IBM offerings

BY ELISABETH HORWITT  
CW STAFF

NATICK, Mass. — Systems software scheduled for introduction today is said to provide IBM users with distributed data base and application capabilities that

reportedly are still in the development stage at IBM.

Advanced Program Xchange Laboratories, Inc. is scheduled to unveil two products, Advanced Program Exchange (APXchange) and Advanced Program Explore (APXplore), which

will provide IBM users with a distributed system environment comparable to a Digital Equipment Corp. Vaxcluster, according to Gigi Wong, director of data communications research at The Yankee Group in Boston.

The products create "a true

networked operating system,"

Wong said, in which users can access computing or data base resources on another host across the network with the same ease with which they access their own local system. Although IBM is working on peer-to-peer

networking and distributed data base products to provide these functions, it still has a way to go, she added.

APXchange reportedly will take care of basic distributed networking functions such as setting up and managing connections and transferring data between hosts.

The other product, APXplore, was designed to handle basic tasks needed to access a given data base environment. It sets up a server on each host that takes applications' and users' requests for data and routes them over the network to the right host. A directory keeps track of active nodes and connections on the network.

The two products should suit MIS managers in financial service companies who want to provide distributed data base access and program-to-program communications across a network of IBM or IBM and DEC systems, according to director of marketing Mitchell Kramer.

A number of companies have grown impatient waiting for IBM to come up with the right tools to implement such systems using LU6.2 and are writing their own software with or without LU6.2 as a component, Kramer said.

## Banking on system

Since last fall, Fidelity Investments and Advanced Program Xchange have been jointly working on a host-to-host communications system that will allow Fidelity customers to receive one statement for multiple accounts, according to Fidelity spokeswoman Jennifer Gavin.

Advanced Program Xchange's communications software plays a key role in the application, which will save the company from sending a lot of redundant mail, Gavin said.

APXchange allows software developers to invoke the full set of LU6.2 functions using two simple commands — send and receive — Kramer said. The software is said to screen developers from the complexities of LU6.2, which features 23 verb states, he added.

IBM's recently announced Common Programming Interface/Communications Interface is also said to provide a simpler set of LU6.2 verbs, but it will not be available until late 1989 and is only announced for IBM's VM and OS/400 systems so far.

APXchange-MVS for IBM MVS systems is available now and is priced at \$78,000 for IBM 3090 systems. The initial releases of APXplore, which support IBM CICS and IMS environments, are priced at \$22,000 for the 3090 and are scheduled to be available next month, according to the vendor.

"IBM is sure to come out with features comparable to ours, but we figure on having a three- to five-year market window," Kramer said.

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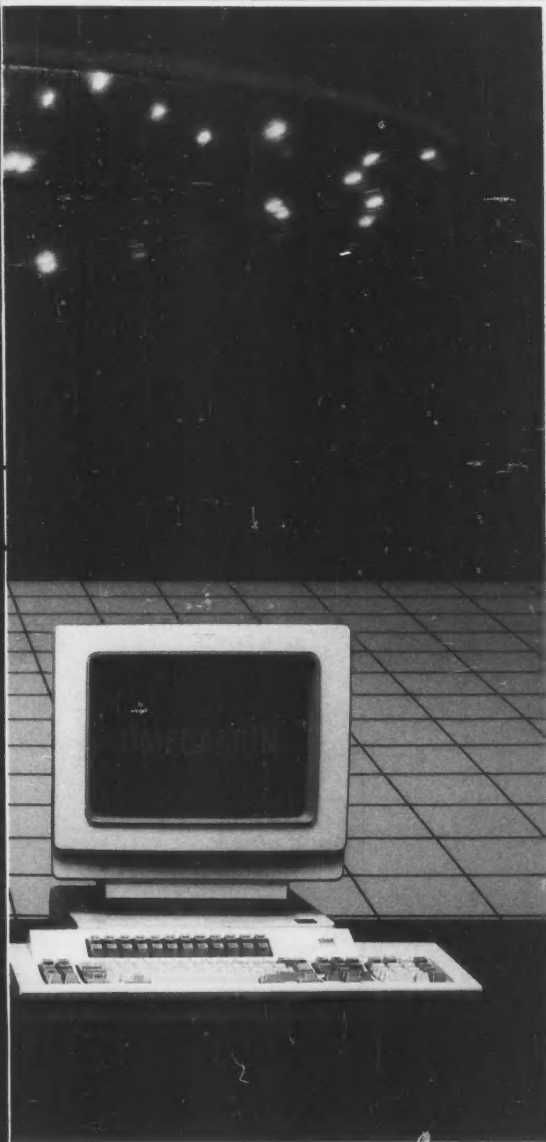
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# Is Here.



# NCR spools up gap-filler

BY JEAN S. BOZMAN  
CW STAFF

DAYTON, Ohio — NCR Corp. is preparing a new series of NCR 9800 transaction processors intended to plug the gap between low-end 9800s and high-end V series mainframes that do not share the 9800's architecture.

The processors, expected by year's end, would provide a seamless upgrade path to the high-end NCR 8800, according to Robert James, vice-president of marketing at NCR's U.S. Data Processing Group.

"The difficulty we have faced is that some significant percentage of the [NCR V series mainframe] base is already at or above the power range of the currently deliverable 9800," James told *Computerworld*. "We have badly needed a more powerful 9800 to address that part of the base. I don't want to give you the specific announcement, but you can look forward to it fairly soon."

## Slowed down

The high-end 9800s have been delayed, he said, by longer-than-expected development times. "The things that have slowed us down somewhat are basically tools that we have always known need to be in the product," James said. Among these are a

transaction monitor, a relational data base and various communications facilities. "We're still fleshing out the array of things that are required for getting into all markets," he said. NCR's plan is to release these software tools as they are completed.

Meanwhile, NCR has devised a migration aid that can be used to off-load the NCR VRX mainframe's work load onto a smaller 9800, James explained. "We have a System Bus Adapter which allows most of the current VRX boxes to be attached to the 9800," he said. "To the 9800, the [attached mainframes] look like an [additional] application processor." James said the technique can be used to off-load mainframe program development tasks and small system utilities to the 9800.

Some users have opted to buy the System Bus Extender option along with a 9800, while others are prepared to wait for the high-end 9800s, according to Emile Bonnez, president of Bonnez, McLeroy & Harrison, Inc., a Dallas-based NCR software provider.

"These V series users will be interested in moving to the new 9800s as long as they have the kind of things that have been promised for them," Bonnez said. "People seem to like the idea of buying 'slices of power,' but they still need high-performance processors."

NCR has told some users that single processing modules on the 9800s will be as powerful as entire NCR 8555 machines, Bonnez said.

"So far, the 9800's attached processors aren't really powerful enough to handle a bank's largest number-crunching jobs," he said. His firm was one of the first V series shops to migrate to a 9800 nearly three years ago.

One NCR mainframe user that did not wait for the high-end 9800s was the Sovran Bank NA branch in Hopkinsville, Ky., which handles \$180 million in assets. "We needed a boost in performance," said Charles Ashley, vice-president of data processing at the bank, which had owned an NCR 8570. In February, the bank installed a newer NCR 8565 Model 2E with higher capacity and better performance.

"The maintenance on the older machine was getting to be prohibitive," Ashley noted, "and buying newer technology carries a lower price tag." As a result of the recent upgrade, the bank will not be in the market for an NCR 9800 anytime soon.

But the new and improved 9800s will not satisfy the capacity requirements of the largest NCR mainframe shops, James said. NCR recently introduced the 8800 mainframe as an upgrade for the largest batch-oriented systems in the NCR user base. "Our base seems very happy with the 8800," he said, "but the 8800 still has the pre-9800 architecture."

## IBM tests

CONTINUED FROM PAGE 1

are congested, you can add capacity quickly," said Dan Bellingham, NSFnet associate program director. For their parts, both IBM and MCI see Phases 1A and 2 of NSFnet as a testing ground for offerings that could become commercially available in the next few years, company spokesmen said.

"This project is important to us for learning how to manage non-SNA environments," particularly Transmission Control Protocol/Internet Protocol (TCP/IP), which is used throughout NSFnet, said Robert Mazza, director of development at IBM's Technical Computing Systems Division. For example, IBM had to write routing software for NSFnet that allows its packet-switching nodes to handle TCP/IP packets at 1.5M bit/sec. now and at 45M bit/sec. in the future, Mazza said.

While IBM supports TCP/IP on its IBM Personal Computers, VM, AIX and RT systems, the vendor has yet to announce TCP/IP network products. IBM hopes its TCP/IP experience on the NSFnet project will help it further penetrate the scientific, research and government sectors that are primary users of the de facto standard, Mazza indicated.

NSFnet will also allow IBM to "experiment with OSI migration," Mazza said. Right now, IBM is jointly working with the University of Wisconsin to develop a Unix-based OSI protocol suite, parts of which will be moved to NSFnet when the Foundation begins its migration from TCP/IP to the ISO's Open Systems Interconnect, he added.

IBM is also using NSFnet to test ways to link its Netview to non-IBM systems, Mazza said.

By the third quarter, the vendor should have developed an extension of Netview

software that allows the network management system to accept network alerts and alarms from devices using the TCP/IP-based Simple Gateway Management Protocol, he noted.

MCI's network services and Network Equipment Technologies, Inc.'s (NET) IDNX T1 switches already have the ability to send network alerts and other data to Netview, via the Netview/PC interface.

The next step is to let those operators respond to network problems by directing a NET or MCI switch to reroute traffic over an alternate line or reconfigure bandwidth to take on the extra load. This capability will require IBM to provide new, interactive connections between its network management system and non-IBM networking devices. "The ultimate goal is for Netview to control all dynamic abilities of the network," said Walter Wiebe, an IBM manager of networking and communications development.

The key word here is dynamic: A NET switch can reconfigure bandwidth as soon as it receives the command, but MCI has not officially announced a similar offering for its own T1 services. However, the

## Into the next decade

The next two phases of the National Science Foundation's NSFnet require some capabilities not yet announced by vendors

Phase	Capabilities	Time frame
1	<ul style="list-style-type: none"> <li>Network management through IBM's Netview, Microsoft's LAN Manager and Network Equipment Technologies' Integrated Network Command System</li> <li>T1 bandwidth</li> <li>Fixed topology, bandwidth</li> <li>Limited dynamic network reconfiguration and bandwidth reallocation</li> </ul>	Currently under way; second-quarter 1988
1A	<ul style="list-style-type: none"> <li>Network Management Application alerts and statistics</li> <li>Limited Netview presentation services for TCP/IP*</li> <li>Manual bandwidth alternative logical topology</li> </ul>	First-quarter 1989
2	<ul style="list-style-type: none"> <li>Network Management Application via TCP/IP*</li> <li>Full dynamic reconfiguration and bandwidth allocation*</li> <li>DS3 (45M bit/sec.) speeds*</li> </ul>	Third-quarter 1989

\* Unannounced

INFORMATION PROVIDED BY MERIT, INC.  
CW CHART

vendor plans to announce early next year a commercial Digital Reconfiguration Service that will provide dynamic reconfiguration of bandwidth, according to MCI Vice-President of Network Systems Engineering Larry Bouman. Until that service is available, users must reconfigure T1 bandwidth manually or through a NET box, he added.

MCI also plans a phased introduction of enhancements to its Netview/PC support that will let its network management service deliver additional kinds of alerts to Netview, Bouman said. And the vendor has introduced a 45M bit/sec. service commercially in time to meet the NSFnet deadline for implementing the higher speed on the backbone, he added.

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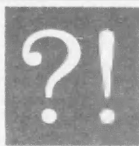
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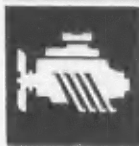
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## EDITORIAL

## Taking the lead

**M**ICROSOFT DESERVES CREDIT for being the first of the big three software vendors to break the standoff over pricing plans for the OS/2-Presentation Manager environment. Perhaps now the rest of the industry will do what it should have done months ago — tell users what they can expect to pay for software next year.

Microsoft has quietly let it be known that it does not intend to charge more for existing applications that it ports to Presentation Manager. That is the first time any of the major developers have gone even that far in outlining a pricing policy. Users who plunk down \$325 for OS/2 Standard Edition Version 1.1 later this year can at least be assured Microsoft won't put them over a pricing barrel as well. Will Lotus and Ashton-Tate now give users the same assurance?

Microsoft's detractors will argue that the task of porting to OS/2-Presentation Manager is a trivial one for that company, which already runs many of its major applications under the similar Windows interface. But that is more a function of good planning on Microsoft's part than it is a reflection on technical simplicity. Microsoft has said all along that Windows was the road to Presentation Manager, and it has apparently followed its own advice.

The rest of the software industry, meanwhile, is playing a game of chicken on the issue of price commitment. Lotus announced a fistful of Presentation Manager products 15 months ago but to date has declined to give so much as a hint of how it intends to price them. Ashton-Tate has implied that it will hike the price of Dbase for the Presentation Manager environment but also won't get specific. Ditto for Borland, the standard-bearer in the last software price war, which so far has been mum on its pricing plans as well.

Will the industry see another price war fought on the Presentation Manager battlefield? We hope not. The software pricing skirmishes of 1985-86 did little more than divert attention from the more important issue of how to maximize the value of the existing technology. So much potential exists with OS/2 and Presentation Manager; it would be a shame to see the market leaders waste time jockeying for position on the discount store's shelves.

Instead, attention should turn to the issue of perceived value to the user, and that's where Microsoft has seized the initiative. By holding the line on applications that run under MS-DOS-Windows and the OS/2-Presentation Manager environment, the company is saying the platform doesn't matter. As long as the Presentation Manager version of an application does not add significant features, multiuser or server capabilities to the DOS version, there is little justification for raising the price.

Lotus may argue otherwise if it chooses to price its Presentation Manager version of 1-2-3 at a premium to the MS-DOS version. But it should be ready to prove it. Microsoft has drawn the first line in the pricing standoff. Other vendors will think twice before they cross it.



**Item:** National Weather Service admits its supercomputer models are inadequate for seasonal weather predictions.

## LETTERS TO THE EDITOR

## Into the future

My congratulations to Jackie Reynolds on her article "MIS managers must see themselves honestly" [CW, May 30].

The problem I see in this area is that the MIS director or vice-president of data processing has a five-year plan to automate his data center and does not know where to begin. So, because of his past 10 or more years of experience in DP and knowledge of out-of-date products when he was once an operator, he tries to implement these same outdated products in a data center that wants to automate for the future.

Obviously, total disaster occurs and more people need to be hired because of the "old" philosophy of the top MIS director from his past knowledge of what worked back then.

Sharon R. Dougherty  
National Sales Director  
Bennett Software  
Houston

## Use it wisely

There is always some risk that successful specialists in one field may begin to believe they have some unique insight, knowledge or wisdom applicable to life in general. This is rarely the case, as in Charles Lecht's column concerning the electoral college [CW, May 16].

This nation was designed as a republic and not a pure democracy. The republic is a safeguard against the abuses of majority rule. It insulates our political life from the whims of an ignorant and emotional public.

The idea of telephone elections is abhorrent and antithetical to stability and justice in government. First, the potential for

misuse is manifold. But more important is the direction our nation would turn politically if that idea took form. The otherwise apathetic and generally parasitic masses would suddenly influence elections.

Getting out of the house to seek out a local polling place at least separates the political couch potatoes from those who are motivated to express a real interest in the life of the nation.

I am an enthusiastic believer in the use of modern technology where applicable. I am in a continual battle of wits over the introduction of computer data processing in my field of business. I have personally argued the point in favor of more telecommunications services and computers in daily life. However, there are practical limits that must be observed. Technology for its own sake can be a disaster.

Bill Copenhaven  
Richmond, Va.

## Steady state

Thank you for including some of my comments in "Vendors skewing DBMS tests" [CW, May 9]. The article correctly pointed out some of the pitfalls involved in analyzing benchmark results.

There is, however, one point I would like to clarify — the concept of steady state. In the performance graphs shown in the Sybase, Inc. benchmark paper, each individual point on the graph represents a completely separate experiment that was run over a sufficiently long period of time to guarantee that steady state had been reached.

Another dimension of benchmark comparisons concerns whether or not the product is commercially available.

Relational Technology, Inc.'s

results were announced on a hybrid version of the system that will not be commercially available until late in the year.

Sybase is also working on advanced versions that will give high transaction rates on multi-processor machines in approximately the same time frame. However, it is an apples-to-oranges comparison to compare Sybase's commercially available version with a demonstration copy from another vendor.

Bert Hartman  
Director of Product Marketing  
Sybase, Inc.  
Berkeley, Calif.

## Understand IRM

I agree with Reed Phillips Jr., director of IRM at the U.S. Department of Commerce, that the administration never really understood the IRM concept [CW, June 6].

It is unfortunate that Robert Head, a former IRM official at the U.S. Department of Agriculture, did not understand the IRM concept at the time his position was transformed into the Office of Information Resources Management. Many newly appointed chief information officers failed to make good IRM managers because they did not understand the concept. The problem with the lack of acceptance of the IRM concept, managing information like any other organizational resource, is the need for

*Continued on page 22*

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.



# HP ripples industry with New Wave

Apple suit actually opened windows for product

AMY WOHL



Hewlett-Packard's New Wave entered the market last November with a big splash, some thought.

Consultants were quick to praise it as the first office automation product with a modern interface and a real feel for personal computer and departmental processor integration.

Others weren't as quick to notice its arrival. HP's information systems products are not well known outside the company's traditional manufacturing and scientific processing markets. The firm is just starting an intense marketing campaign to reach end users.

Like OS/2, New Wave is a software environment without software. It can run existing DOS applications, but to fully exploit the environment, you need software specifically written for such exploitation. There isn't any yet.

But HP got lucky in a very strange way. Apple determined to protect the value of its graphical user interface and sued Microsoft and HP over New Wave and its underlying Windows environment. This action forced journalists and consultants to spend lots of time explaining what New Wave is to users in the process of analyzing the lawsuit for them.

## Integration interest

HP has expressed a commitment to New Wave that is unique among office automation vendors. This PC interface is the first we know of that will eventually run not only across PC platforms (DOS and OS/2) and across the vendor's proprietary mid-range platform (HP's 3000 and Spectrum) but also across the vendor's Unix products.

This feature is important, because it expresses an interest in bringing Unix and proprietary platforms together under a single interface and environment.

Integration will occur via HP's Information Access product and the Agent facility in New Wave. These are software products that let systems be interconnected — and data be moved — across PCs as well as across larger systems from both HP and other vendors.

New Wave is enticing to users

Wohl is president of Wohl Associates in Bala Cynwyd, Pa., and editor of "The Wahl Report on End-User Computing" newsletter.

for a number of reasons, including the following.

- Users like the chance to get a graphical user interface without leaving their PC workstation platforms and without moving to more expensive, larger OS/2-capable platforms.

- They like the opportunity to use HP's Information Access facility to get at data on IBM and HP computers without the need to understand the whole data base apparatus on those systems.

- They like the cleverness of HP's Agent software, which permits professional programmers or end users to combine functions across data sets, applications and systems.

- They like the promise of a totally integrated, object-oriented environment based on rewrites of existing DOS software or

**A**NNOUNCING software for a platform that features integration as an enticement means you are gambling on the timely availability of other software from other developers.

whole new products written to the New Wave environment.

And therein lies the rub. HP's New Wave is an environment on top of an environment, like Microsoft's Windows. It represents one of more than eight choices now available to enterprising software developers:

1. DOS.
2. DOS under Windows (which Windows, which DOS?).
3. OS/2 Version 1.0.
4. OS/2 Version 1.1 (with Presentation Manager).
5. IBM's OS/2 Extended Edition Version 1.0.
6. OS/2 Extended Edition Version 1.1 (with Presentation Manager).
7. Varieties of Unix.
8. Digital Equipment Corp.'s VMS/All-In-1.

## Heavy competition

HP must compete for development attention in a very crowded market. Add in the fact that by the company's own estimates, New Wave requires about 25% more development effort for each software package, as compared with the Presentation Manager. HP may have to wait a while before

Continued on page 22

# The medium to the message

High-tech firms seek to optimize effectiveness of information processing

CHARLES P. LECHT



However powerful the forces that mold our world of information processing may be, none is more po-

tent than the one through which all others find expression — the media.

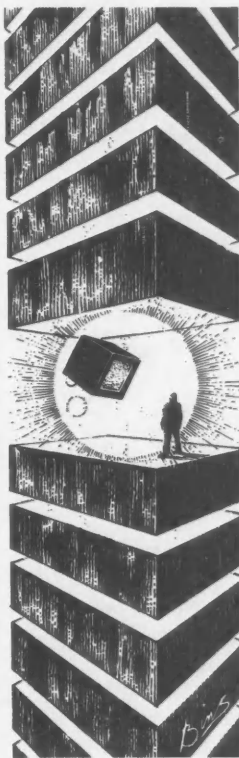
We cannot progress without the means to inscribe, contain and ship the information we process, whether by paper, disk, laser beams or video signals.

Some high-tech firms are investing heavily in order to better understand the world of media. Computer manufacturers, universities, broadcast networks, consumer electronics firms and even modern printing companies are creating or joining collectives to fund the creation of media laboratories to conduct research.

The development at America's flagship high-tech university, MIT, of its New Media Laboratory underscores the importance being attached to scientists, businessmen and government officials understanding media as the age of information systems technology matures. The relationship of information content to information media is too critical to be ignored.

Japanese firms are also intensely interested in media studies. Some participate in the funding of labs abroad, such as at

Lecht is an IDG News Service correspondent based in Tokyo.



CHRISTOPHER BING

MIT, endow university laboratories in Japan or create their own.

Private financing of media labs by Japanese companies is on the rise, and Sony Corp.'s Media World is a prime example. The Sony folks — famous for their

creative consumer electronics products — demonstrate a very large commitment to media exploration.

Occupying 2,100 square meters of floor space in one of Tokyo's high-rent districts, Media World is an advanced technical demonstration center that offers a vast sea of devices, all dedicated to creating and distributing information specifically within the corporate world.

## Form and content

Part of Media World's reason for existing is to convey the Marshall McLuhan-esque rule that media may be as important as the information they contain in conveying any message — including Sony's.

Teleconferencing facilities at Media World offer two-way television communication along fiber-optic lines between two widely distributed office facilities. Large screens at both locations present the images of those not physically there. The information encoding is performed so efficiently that virtually instantaneous transmission is achieved, providing the feeling in either facility that the two places have been merged into one.

Sony has built a conference room that responds to the human voice to turn on or off the lights, open or close the curtains and so on.

Video projection systems connect to worldwide computer-driven data bases for instant storage, retrieval and display of information.

Continued on page 22

# Well, they have to start somewhere

CLINT WILDER



The moniker "computer whiz kid" usually conjures up the image of a bespectacled Bill Gates or bearded Steve Wozniak whipping up the next revolutionizing techie invention. But if they count as "kids," you ain't seen nothin' yet.

A group of Dallas-area day-care toddlers were recently discovered working on a project of recompiling the code of Uccel Corp.'s UCC-11 data center job

management software.

Well, sort of. They were probably recompiling it into paper hats and origami turtles.

The discoverer of this bizarre moment in programming was Scott Speck, a former Uccel systems programmer. Speck was later taken to court by Uccel's buyer, Computer Associates, for allegedly taking proprietary Uccel code with him to his new company, a charge he denied.

In the midst of the legal flap, Speck went out to lunch one day with fellow employees. In the back of his colleague's car, Speck found strips of paper printed with what looked amazingly like the very code of an unreleased version of UCC-11 that he had been accused of stealing.

"Where the heck did you get this?" he asked incredulously.

"It's paper my kid brought home from day-care," came the response.

Sure enough, the day-care center had asked parents to donate scrap paper, and one parent, a Uccel employee, donated

dumped printouts. "You can imagine the panic in my mind," Speck told *Computerworld*. "I thought Computer Associates was planting them in everyone's cars."

Speck later settled the charges out of court. He said his attorneys used the day-care discovery to help challenge the merits of Computer Associates' claim that code printouts constituted a trade secret. "I've never known a 5-year-old to do very well with a trade secret," Speck said. Then again, maybe we're selling these kids short. Maybe there is some leading-edge software development going on in that playroom.

Tots elsewhere may go to assembly; the Dallas kids write assembler. Other kids play with cars; these high-tech toddlers design bus structures. Watercolor painting? Not for this crowd. We're talking high-resolution graphics with user-friendly interfaces and pull-down menus. And rumor has it Dallas's Ross Perot is behind the whole thing.

Wilder is *Computerworld's* senior editor, computer industry.

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## HP ripples

CONTINUED FROM PAGE 19

New Wave software arrives in the marketplace.

But some developers will find the investment to be quite worthwhile. HP recently announced Microsoft's intention to market a New Wave version of Excel. (One might say Microsoft has a vested interest.)

### Consider this

Excel is a first-class package, with a very respectable market share. Microsoft's reputation as a savvy and very profitable software company may entice other developers to follow suit.

There are additional facts for developers to consider. Announcing software for a platform that features integration as an enticement means you are gambling on not only that platform and your software working well together but also on the timely availability of other software from other developers.

It is the total software and its combined capabilities that make any environment user-irresistible. Every New Wave developer has a stake in how many other developers decide to plunge into HP's New Wave.

HP and Microsoft are still being sued by Apple, which could make the gamble just a tiny bit riskier. This issue is not a major one in our eyes, but then, we're not developers.

Nothing written here is meant to suggest that New Wave is not a terrific idea or a nice, robust platform. HP's own development community will no doubt give it a long look. But HP developers are generally minicomputer-focused rather than PC- and graphical user interface-focused. They might well fail to exploit the potential—or it might take them a long time to completely understand how best to succeed.

Then again, there is the possibility—actually, we'd guess, HP's fondest dream—that New Wave will be recognized as a suitable standard for a new generation of PC-compatible software.

If that dream comes true, HP might find itself in the very middle of the next big game.

## Medium

CONTINUED FROM PAGE 19

In one minitheater projection environment is Sony's Video Theater System. The ease of use of this technology convinces me that the day of the conventional movie camera projecting film from the rear of a theater is destined to die.

And Sony's digital television technology, costly as it may be today, convinces me that today's analog TV will soon suffer the same fate.

With the arrival of digital TV, displays

**P**ART OF Media World's reason for existing is to convey the rule that media may be as important as the information they contain in conveying any message.

for computer systems and for television will quickly merge. This done, the day of interactive TV will arrive, bringing a dimension in viewing of fantastic consequence. Think about the processing possibilities that may arise through the use of your PC's memory as a video-recording medium.

These few examples from Media World typify what can be experienced in other media labs in Japan and elsewhere. They serve to point out the weaknesses in our natural perceptive powers and offer hope that through enhancement of our senses, the information we encounter will not enter the realm of the null and void.

## IRM

CONTINUED FROM PAGE 18

education. Few college MIS textbooks give IRM adequate coverage; some authors go out of their way to put IRM in a chapter in the rear of the book, with little introduction or references. Others omit the concept entirely, and some use the IRM terminology without understanding the concept.

There are no easy solutions to proper information management. If these solutions did exist, there would not be the excessive applications development backlogs or the systems and program maintenance problems that exist today.

This is a nation of experts in on-line transaction processing, but the type of information management that can be provided by the IRM concept is needed to lead managers in the development of the information they need in decision making for the benefit of the entire organization.

MIS managers have made major contributions in transaction and on-line processing, but it is now time for those who know the company and know what information is needed to manage the company or agency information resources. The IRM concept, properly implemented and administered, can provide the necessary information management leadership.

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# SOFTWARE & SERVICES

## SOFT TALK

Theodore L. Bogert

### Rules to modify by

We all have our own horror stories regarding the problems we've encountered as a result of the lack of program modification controls in a production environment.

At Comprehensive Banking System, a division of Citicorp Information Resources, we have developed a system for both controlling and tracking all program modifications to our application software. This system is currently running on an IBM System/36 and 38, with the necessary machine-inherent differences.

The following explains our approach.

#### Overview of the system

The overriding theory behind any system for controlling and tracking program modifications must be based on the cardinal rule: Never allow any modifications or enhancements directly to the base code.

By dictating that changes and new programs be created only outside of the production environment, you establish more flexible and easily adaptable conditions for programming and testing.

To accomplish this objective, Comprehensive Banking System created a series of libraries that correspond to different stages of the modification cycle. As a particular member travels through the cycle, a tracking program updates a "log record" to reflect the member's current status. The log

*Continued on page 30*

## Weeding a homegrown shop

Barry Controls picks packaged software to standardize, cut upkeep time

BY ROSEMARY HAMILTON  
CW STAFF

WATERTOWN, Mass. — While many mid-range users sized up IBM's AS/400 offering last month, one IBM System/38 user was preoccupied with a more pressing and predictable concern: its already-in-motion transition to packaged software.

Barry Controls, a producer of shock and vibration isolation devices, has been a System/38 user since 1981. Late last year, it made its first packaged software purchase, which marked the start of moving from a completely homegrown software environment to one of packaged software.

The decision of the company, a division of Barry Wright Corp., to move to vendor software came about for two reasons, according to MIS director Paul Choquette.

First, the parent company's industrial products unit, with six divisions, wanted to standardize on certain software packages. Second, for Barry Controls in particular, the current software showed the marks of years of tweaking. Upkeeping the software had become too time-consuming for Choquette's staff of seven programmers.

#### Instant gratification

"Some programs were developed without thinking beyond the current moment," Choquette said. He said he sometimes has to clear users off the system to do certain closings because they were "developed for a batch environment, and we're an interactive environment now."

The first software package selected was a human-resource and payroll application from Software 2000, Inc. The pack-

age has since been designated the corporate standard for all industrial products divisions at Barry Controls, Choquette said. Within the industrial products group, there had been at least three different payroll applications in use, he said.

The Software 2000 application was installed at the Watertown plant last year and put into operation in the fall. Choquette said an outside consultant is currently evaluating Barry Controls' manufacturing needs and will assist the company in selecting a manufacturing resource planning package this year. Additional financial applications will also be picked by year's end.

The transition will take place gradually. "There's always some resistance to change. Overall, I think people are looking forward to it, because we have been in a constant patch-and-fix mode,"

*Continued on page 29*

## Mathsoft package adds up

BY NELL MARGOLIS  
CW STAFF

CAMBRIDGE, Mass. — The latest software package from Mathsoft, Inc. promises users charged with high-intensity mathematical analysis a tool that provides mathematical calculations at the speeds allowed by a workstation platform.

Slated to be available by summer's end, Mathstation combines a graphical windows-based user interface, systems programming power and networking capabilities to afford users the freedom to concentrate on the substance of mathematical applications rather than the technological form, said product manager Sue Hutchinson.

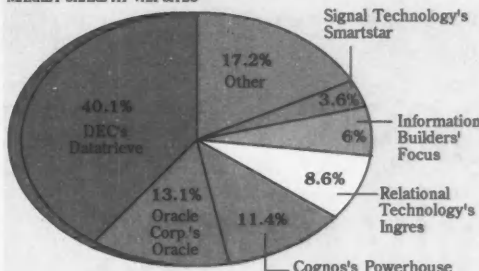
*Continued on page 25*

## Data View

### VAX sites welcome newer talent

Data base vendors Relational Technology and Oracle are gaining a foothold in the DEC VAX market alongside better established fourth-generation language vendors

MARKET SHARE AT VAX SITES



INFORMATION PROVIDED BY FOCUS RESEARCH SYSTEMS, INC.  
CW CHART

#### SOFTWARE NOTES

### Prime 50 to get Unix

Prime Computer, Inc. plans to put a native version of the AT&T Unix System V operating system on its Prime 50 series of superminicomputers. Currently, the hardware supports Prime's proprietary Primos operating system, which it will continue to support. Prime's Unix offering will be made available in mid-1989, the company said.

Little-known Ibuki in Mountain View, Calif., is offering its Common LISP on Sun Microsystems, Inc. workstations, according to President Richard Weyhrauch.

Hewlett-Packard Co. and Verdex Corp., which is based in Chantilly, Va., recently signed marketing and development agreements that will put the Verdex Ada Development System on HP workstations and minicomputers. Both firms said there will be a series of six product releases during the next 12 months.

*Continued on page 25*

#### Inside

- Data Design offers modeling ledger system. Page 25.
- AI technology bolsters business trends review package. Page 29.
- SCS boosts Cray supercomputer performance. Page 32.

## BIM Spotlight

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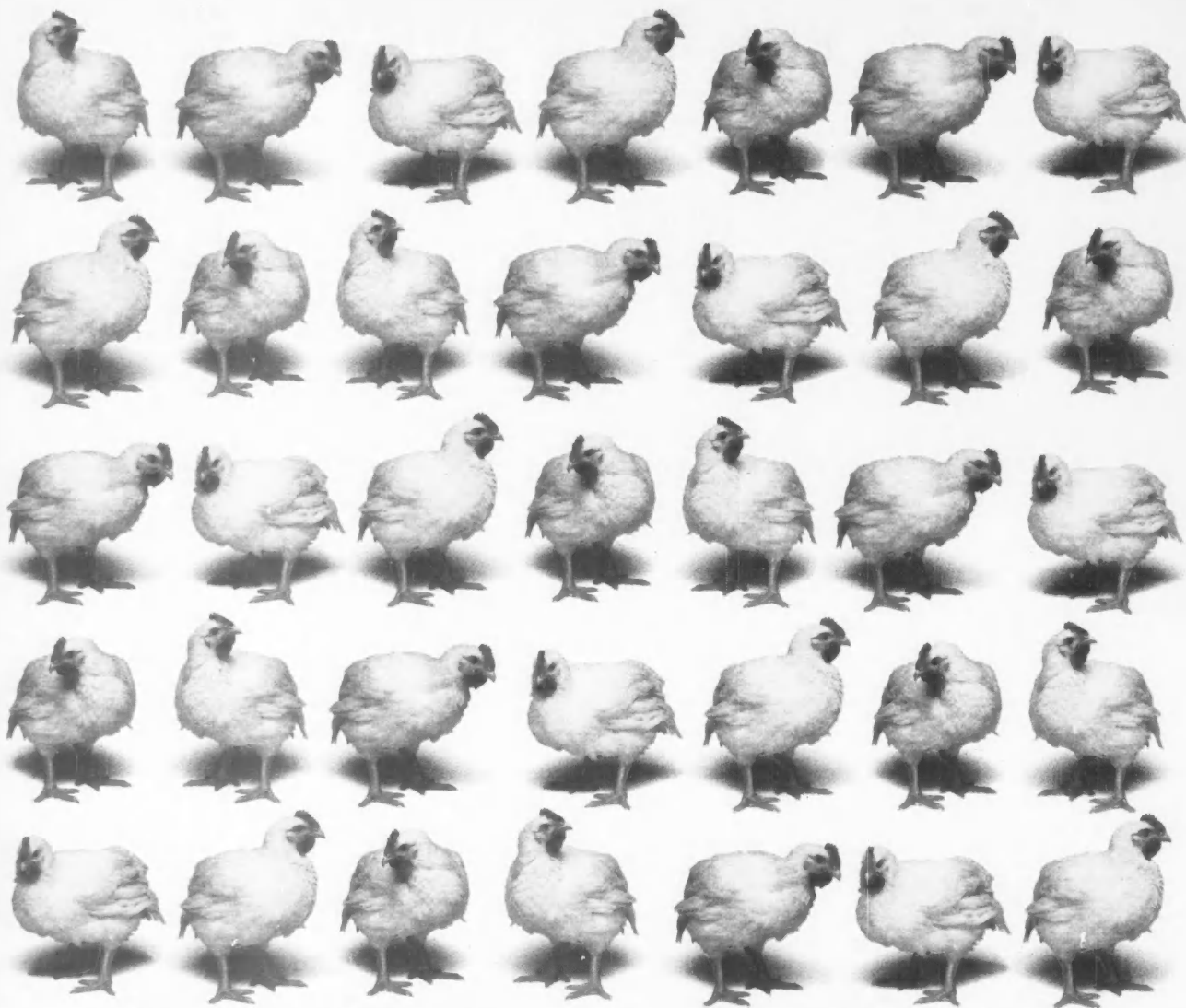
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# CINCOM Boosts Production At Holly Farms.

**PROBLEM:** Improving programmer productivity in order to reduce a large applications backlog

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**Mr. Bill Clontz**  
Director of Computer Services  
Holly Farms Foods

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"MANTIS was ideal for us because you don't need 2-3 years of experience to use it," explained Bill Clontz, Director of Computer Services at Holly Farms. "It lets us take new graduates, quickly train them and, in a matter of weeks, turn them into valuable programmers."

As a result, programmer productivity at Holly Farms has reached an all-time high. "We've seen substantial improvement ratios," Clontz said. "In the time a programmer might turn out one CICS command-level program, he can turn out from six to eight programs on MANTIS."

Most of the 500-plus MANTIS applications now in production at Holly Farms are aimed at streamlining costs. For example, Data Processing used MANTIS to develop a model of how chickens consume feed over the course of their lives, allowing Holly Farms to cut production at one of its feed mills by 1½ days a week.

"We've got key users who are picking up on the term 'MANTIS,'" Clontz noted. "Around here, MANTIS has become a synonym for 'get it done quickly.'"

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C. Microcomputers/Desktops  
D. Communications Systems  
E. Office Automation Systems  
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32. Programmer, Methods Analyst  
35. Dir., Mgr., Suprv., CAI/WP  
38. Data Comm. Network/Systems Mgt.  
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12. Vice President/Asst. VP  
13. Treasurer, Controller, Financial Officer  
41. Engineering, Scientific, R&D, Tech. Mgt.  
51. Sales/Mktg. Mgt.  
**OTHER PROFESSIONALS**  
60. Consulting Mgt.  
70. Medical, Legal, Accounting Mgt.  
80. Educators, Journalists, Librarians, Students  
90. Others \_\_\_\_\_  
(Please specify)
- COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant.  
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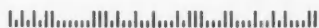
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## Data Design package weds financial systems

BY NELL MARGOLIS  
CWI STAFF

SUNNYVALE, Calif. — Data Design Associates kicked off its new line of analytically endowed accounting software with last week's debut of GL/E, a package said to wed a general ledger system with financial forecasting and modeling capabilities.

According to Data Design Vice-President Paul Salsgiver, calculation capability built in to the company's general ledger software cuts down on redundancy and increases flexibility. GL/E users are able to do work that used to entail not only external software systems but also an additional group of users, Salsgiver said.

For example, Salsgiver explained, forward pricing calcula-

tions that have to be made in order to comply with government reporting requirements can be done with the GL/E calculation module. Similarly, multilevel sales compensation programs and company profitability analyses can be accomplished from within the general ledger.

"Before, all our expense reporting was done manually," said a systems analyst at a large company division that served as a GL/E beta-test site who did not wish to be identified.

With a need to allocate dollars to hours for project work done by each individual in the employee base as well as project codes, overhead and other cost factors, "it took a lot of people," the user said. With GL/E, he continued, "we're cutting computer run-time by as much as 20% to 25%,

and people are freed up to analyze numbers instead of just cranking them."

### Taking care of business

The calculation and allocation features include the ability to define global allocation rules and selective overrides that lessen the time it takes to set up an allocation. In addition, the extended general ledger offers users expanded companywide control specifications and the opportunity to perform calculations within an allocation, storing the results in a master file amount field, according to Data Design.

Trial posting and calculate-only options allow users to test and report results without altering the master file, company spokesmen said.

Available immediately on IBM 370 platforms under IBM's MVS, MVS/XA, IMS, DOS, DOS/VSE and Applied Data Research, Inc.'s Datacom/DB, Data Design's GL/E is priced from \$110,000 to \$170,000, depending on configuration.

## Prime 50

FROM PAGE 23

Citicorp Information Resources in Greenwich, Conn., has agreed to market programming tools made by Aldon Computer Group in Oakland, Calif. Citicorp will offer the tools to its banking clients that run its Comprehensive Banking System for the IBM System/38 platform. Aldon claims that its S/Compare and S/Compare-Harmonizer tools cut application upgrade time approximately in half.

James Goodnight, president of SAS Institute, Inc., has received recognition from an unlikely source. He was named Chief Executive of the Year by the International Television Association for his encouragement of the use of videos as training tools both internally and among SAS customers. Goodnight is also fond of using extravagant videos to open SAS users group conferences.

The Oracle data base management system is available on Control Data Corp. Cyber superminicomputers, Oracle Corp. officials recently announced.

Relational Technology, Inc. will sell its Ingres relational data base management system through French firm Matra Communication, Inc. Matra produces a Unix-based machine.

Massoglia & Associates, Inc. in East Lansing, Mich., is offering five publications on the IBM System/36 that provide tips, techniques and training procedures for the IBM mid-range system. They range in price from \$42 to \$65.

Apollo Computer, Inc. signed a deal with McDonnell Douglas Manufacturing & Engineering Systems Co. that it

estimated at \$15 million. McDonnell Douglas plans to offer its Unigraphics computer-aided design and manufacturing (CAD/CAM) software on Apollo's workstation platform.

Applied Digital Data Systems, Inc. in Hauppauge, N.Y., said it intends to implement the Pick Systems Open Architecture version of the Pick operating system. The Open Architecture version was one of many areas of controversy in the Pick market in recent years. Many Pick licensees claimed they had already implemented on their own systems many of the features that the Open Architecture version was supposed to have.

Duquesne Systems, Inc. said it has made good on a 2-year-old promise of merging two products into one. The systems software company acquired the Single Image Software product line from Udata Software Co. in 1986 and committed itself to merging the Udata products with the Duquesne Shared Data Management products. The firm made Multi-Manager available last month. Duquesne said it combines the best features from both product lines.

Electrical Engineering Software, Inc. said it has ported Precise, its analog circuit simulator software, to the Alliant Computer Systems Corp. platform. Meanwhile, Alliant competitor Convex Computer Corp. said its Ada compiler has been certified by the Ada Joint Program Office.

Cadcam, Inc. signed a five-year deal with General Motors Corp. subsidiary Electronic Data Systems Corp. (EDS) to supply GM and other EDS customers with CAD/CAM software. Cadcam will supply its CAD/CAM software for Unix-based workstations to GM.

## Mathsoft

FROM PAGE 23

The Mathsoft offering is aimed at large industrial, governmental and academic users who rely on both math and Fortran for calculations, modeling, simulation or analysis.

### Mathematically inclined

Able to integrate math, text and graphics, recalculate results upon any change and distribute computations across heterogeneous computer networks, Mathstation "brings together and simplifies a lot of what has become a pretty complicated environment for the user who wants to do more work with math and less programming," Hutchinson said.

Mathstation draws power

from a proprietary programming language based on a what-you-see-is-what-you-get editor that lets users express problems in mathematical notation, Hutchinson said. The software itself automatically translates the mathematical expressions into ANSI-standard Fortran 77 routines.

Written in C and supplemented by a large collection of mostly standard numerical algorithms, mathematical functions and networking and graphics routines, Mathstation also includes Fortran subroutine libraries. According to the vendor, users then add their own math operators, functions and Fortran routines, using the editor and interface to do so easily and symbolically.

Thus, Mathstation users will be able to protect their invest-

ments in existing Fortran while creating new portable Fortran applications, Hutchinson said.

The initial Mathstation release will run on Sun Microsystems, Inc. Sun-3 and Sun-4 workstations. By the end of the year, Mathstation should also be available on Digital Equipment Corp. VAX computers under both VMS and Ultrix. A series of ports to additional Unix-based workstation platforms will follow, starting at the end of the first quarter of 1989, according to Hutchinson.

Prices for the Mathstation package, which also requires the user to have the X.11 version of the X Windows user interface and the hardware platform's appropriate Fortran 77 compiler, will begin at \$9,500, with discounts and site licenses available.

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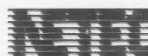
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## Cygnnet gives SQL support

LOS ANGELES — Phoenix Software Co. has extended its Cygnnet fourth-generation language to include support for IBM's relational SQL/DS in the DOS/VSE operating environment.

In addition to being one of the few products to work with SQL/DS, Cygnnet is something of a special case among fourth-generation languages. It can be used to develop a program interactively, with testing and debugging on a line-by-line basis, as with other fourth-generation languages. But a finished system can be compiled to run in batch mode, Phoenix spokesmen said.

The support includes working with SQL/DS in the IBM DOS/VSE environment under CICS and VTAM and with VSE/SP in batch.

SQL/DS is IBM's relational data base management system and runs under VM and DOS/VSE. Cygnnet/SQL supplements IBM's Structured Query Language, which works with SQL/DS by giving users an application language in addition to the data retrieval and manipulation provided by SQL, a "retrieval-biased language," according to Steven L. Bender, Phoenix's director of marketing.

Cygnnet with the SQL/DS interface version is available immediately and costs \$33,000. Cygnnet will get IBM DB2 support later this year and is now available for use under IBM's MVS/SP and MVS/XA operating systems, Phoenix officials said.

DOS 2.0 or higher is required for use with SQL/DS. Phoenix does not yet have a version of Cygnnet that works with the VM operating system.

## Execucom climbs corporate ladder with supportware

AUSTIN, Texas — Execucom Systems Corp. last month introduced Executive Edge, its first move into the executive support systems market.

The product is said to include

artificial intelligence technology by providing a facility that can automatically explain in simple terms the likely causes of business trends and variances the executive is reviewing. These re-

ports rely on both text and graphical descriptions to illustrate the causes behind business events.

The system also provides typical executive support facilities, such as analysis tools, to work with company information and general business trends.

Execucom said the product is based on its corporate planning and decision support system,

which gives it the ability to pursue "what if" analysis as well as questions of "what is," "what's best" and "why" questions.

Executive Edge, available now, carries a license fee that ranges from \$35,000 to \$150,000.

Users can access Executive Edge from a personal computer, for which a user interface and graphics component is required.



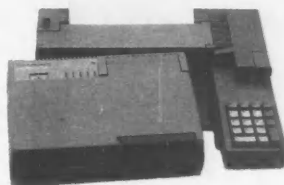
## TI's new TravelMate™ LT220. It's the closest thing to carrying a VAX™ in your briefcase.

Texas Instruments introduces the LT220 lap-top terminal — the next best thing to being there when you need remote access to your company's VAX.

The LT220 provides full VT220 emulation in a 4.8-lb. package, without sacrificing functionality. It features a 25-line screen that's easy to read. It even has a full-function keyboard like the one on a VT220.

The terminal communicates at 1,200 or 2,400 bps through one of its optional internal modems. For hard copy, just slide the LT220 into one of its optional cradles to add an ink-jet or thermal printer.

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let you create, update and store files. They're also handy for programming the LT220 to your specific application.

Like its Silent 700™ predecessors, the LT220 sets new standards for portability, durability and reliability. All of which makes it the perfect tool for any-

one who's ever wished for a VAX in their briefcase. In short, this may be the best little terminal in the world.

So go ahead. Take the first step toward improving your productivity today. Call Texas Instruments for more information or to arrange a demonstration of the LT220. **Phone toll-free, 1-800-527-3500.**

**TEXAS  
INSTRUMENTS**

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## Weeding

FROM PAGE 23

Choquette said.

This project seems far less glamorous than a move to the much-talked-about AS/400 platform, but Choquette said he prefers to "keep looking realistically and build [the AS/400] into our plans rather than build plans around it."

Nonetheless, he said he sees the AS/400 as part of the company's future. He said he was most impressed with the "assurances that the programming environment we know will be maintained."

Choquette, a System/38 user for nearly eight years, said he "doesn't think any other system compares to it." He pointed to the editing, compiling and on-line debugging as features that are a big plus for System/38 programmers.

## Bogert

CONTINUED FROM PAGE 23

record will eventually become one of the member's permanent history records.

### Tracking considerations

The ability to track a particular member's modification history is important in maintaining the integrity of a program modification system. This history can be a very limited or elaborate collection of data; however, the more detailed the record, the better the chance that someone else — or even the original programmer — can later understand what a particular modification represented.

**T**HE OVERRIDING THEORY behind any system for controlling and tracking program modifications must be based on the cardinal rule: Never allow any modifications or enhancements directly to the base code.

The tracking program includes an on-line vehicle for entry of the information you want to track. The program must create and update the corresponding log record for each member as it moves through the cycle.

As the member is modified, it is copied or moved to the appropriate library for that stage of the modification cycle. Therefore, you will need to create the fol-

lowing libraries:

- MODLIB — the modifications/development library.
- QALIB — the quality assurance testing library.
- QAFIX — the interim correction library used by quality assurance to store programs that do not meet requirements.
- TEMPBASE — the temporary modi-

fied base code library.

Next, assign the person or persons responsible for each library. You will need to establish the appropriate security and modify each person's sign-on to incorporate the appropriate library lists. The establishment of different sign-ons to correspond to the different modification libraries can be used in a multiprogrammer environment to make each programmer responsible for an individual task.

### The modification cycle

To illustrate how the system works, I will follow a sample member as he progresses through the entire modification cycle.

**Step 1:** The assigned programmer copies the source statement from "base" into the library MODLIB. The programmer enters any pertinent information about the member via the on-line entry mechanism provided through the tracking program. The tracking program uses this information to create a log record for the member. The programmer makes the necessary changes and then compiles and unit-tests the member. After successful unit testing, he passes the member to quality assurance.

**Step 2:** Quality assurance moves the source code to QALIB. At the same time, it removes the source and object code from MODLIB, thereby ensuring that only one copy of modified code exists in the system. As in each step of the cycle, the tracking program updates the log record. Quality assurance then tests the modified member. If quality assurance is satisfied with the modification, it moves the member to library TEMPBASE (see Step 4).

**Step 3:** If quality assurance detects a problem, it removes the source and object code from QALIB and places the rejected member in library QAFIX. A programmer, preferably the original programmer of the modification, works on the problem and then compiles and unit-tests the member. He then returns the member to quality assurance for a repeat of Step 2.

**Step 4:** Quality assurance then removes the source and object code from QALIB and places it in library TEMPBASE. The tracking program updates the log record to reflect the move. The library TEMPBASE must be placed ahead of all other libraries in production so that your system will execute the modified members rather than the "base" members.

**Step 5:** After sufficient testing in a production environment, remove the source and object from TEMPBASE and place it in your base library, replacing the original, unmodified version of the member.

Since implementing our program modification system, we've found it much easier to control the integrity of our software. We can afford to allow for a longer duration of test time because the unmodified code remains in place in our production software until it is replaced by the modified code; there is no cause to rush the testing. Because the modifications are thoroughly tested before they are used in production, there is less chance of destroying live production files. Finally, enhanced security results from the segregation of libraries.

Bogert is a senior systems programmer analyst at Comprehensive Banking System, a division of Citicorp Information Resources in Orlando, Fla.

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## NEW PRODUCTS

## Systems software

**Scientific Computer Systems Corp.** (SCS) has enhanced the performance of the **Cray Operating System** on SCS supercomputers, the company said.

**Release 05B** of the system reportedly allows users to improve the performance of their current configuration and also to connect other disk drives to their computer systems.

Enhancements to the operation system enable SCS hardware to automatically perform bidirectional memory transfers while maintaining binary

compatibility with Cray Research, Inc.'s Cray X-MP architecture. Release 05B runs in both interactive and batch environments.

Release 05B is priced from \$295,000. SCS, 10180 Barnes Canyon Road, San Diego, Calif. 92121. 619-546-1212.

**ETA Systems, Inc.**, the supercomputer subsidiary of Control Data Corp., has announced its Unix operating system, designated **ETA System V**, for ETA10 supercomputers.

The new operating system reportedly complies with the System V Interface Definition Release 3 and is compatible

with AT&T's Unix System V on CDC's Cyber 910 workstations.

The product supports Transmission Control Protocol/Internet Protocol, Ethernet communications and transparent file sharing via network file system protocols. Fortran and C compilers are included.

ETA Systems, 1450 Energy Park Drive, St. Paul, Minn. 55108. 612-642-3400.

## Applications packages

**Computer Solutions, Inc.** has introduced the **Growthpower Lot Control** package for manufacturers using Hewlett-Packard Co. HP 3000 series mini-computers.

The product is said to facilitate the lot control function by enabling users to assign either a lot or serial number control to each part from a range of 20-char. alphanumeric lot numbers. Any part may be lot- or serial-number controlled, including components, subassemblies and final assemblies. Shelf life and expiration date assignments per part are also included.

Growthpower Lot Control costs from \$15,000 to \$25,000.

Computer Solutions, 1 Burlington Woods, Burlington, Mass. 01803. 617-229-2200.

An enhanced version of a disk analysis and space-management software package that runs on Digital Equipment Corp.'s line of VAX computers is now available from **Demac Software**.

**Pakmanager V1.1A** has been upgraded to allow generation of 8,191 distinct reports. Areas of primary focus are wasted disk space, lost disk performance and overall disk status. The product will also identify performance problems, including wrong cluster factor, excessive directory nesting and disk fragmentation.

Pakmanager V1.1A costs from \$495 to \$2,995, depending on VAX CPU.

Demac Software, 1260 Old Innes Road, Ottawa, Ont., Canada K1B 3V3. 613-748-0209.

## Utilities

A program that reportedly will allow automatic markup of word processing documents in electronic publishing environments is available from **Shaffstall Corp.**

Called the **SGML Translator**, the software is an option to the company's Model 6000 Media Conversion system. The program will identify and tag text objects so that documents may be edited, stored and paginated without losing their overall structure, the vendor said. The product also contains a utility that allows the user to customize the markup tags to fit specific electronic publishing systems. The SGML Translator costs \$2,500.

A version for Department of Defense/CALS applications is also available. The **SGML/CALS Translator** was specifically designed to output and validate SGML MIL-M-28001 documents. It costs \$5,000.

Shaffstall, 7901 E. 88th St., Indianapolis, Ind. 46256. 800-248-3475.

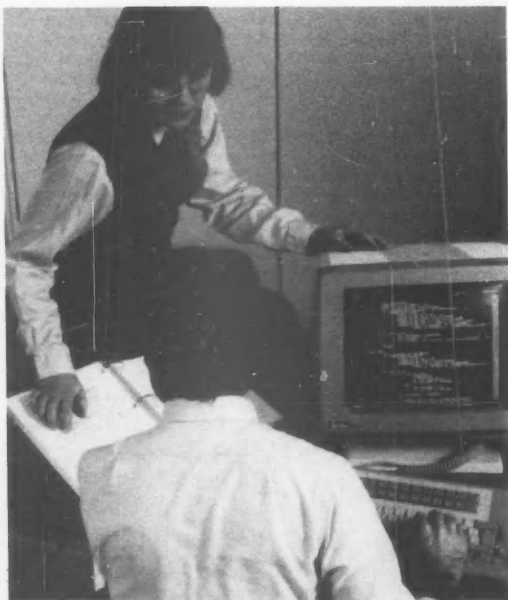
## Development tools

**Sage Software, Inc.** has expanded its APS Development Center product offering with the addition of **APS/IDMS**.

The APS/IDMS generator was reportedly designed for developers who prefer generating Cobol or Cobol II source code to using fourth-generation language products and for users with multiple data base management systems such as IBM's DB2 and Cullinet Software, Inc.'s IDMS. The product will run under IBM's MVS and PC-DOS operating systems and is compatible with several DBMSs, including DB2, IMS, VSAM and IDMS. Data communication environments supported include IBM's ISPF, CICS and IMS/DC.

The APS/IDMS system is available as an add-on product to current users for a \$50,000 permanent license fee. For new customers, APS Development Center configurations cost from \$100,000 to \$200,000, depending on options.

Sage Software, 3200 Monroe St., Rockville, Md. 20852. 301-230-3200.



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# MICROCOMPUTING

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Douglas Barney

## Basic with cheese?



**Gee Whiz Basic!** Last week I got a call from a college student asking what the GW in GW-Basic stood for. No one here knew, and we became darn curious. So a call went out to Microsoft, and in that company's typically efficient way, an answer was gotten.

According to Greg Lobdell, product manager for the languages group, there are three theories. One is that GW stands for Gee Whiz Basic. Another is that it stands for Gates, William Basic, and a third is that it stands for Greg Whitten Basic, Whitten being a key research and development figure in the Microsoft languages group. But Lobdell says Whitten denies that the language is named after him, and Gates refers back to Gee Whiz.

There is now talk of Kraft coming out with a competitive product, Cheese Whiz Basic, but for now, Gee Whiz it is.

**Who wants what?** At a recent panel session on the future of software, I asked folks in the audience how many were sick and tired of Microsoft's MS-DOS and wanted something better.

*Continued on page 41*

## Attention shifts to PS/2 Models 50Z, 70

Dealers report increase in sales after announcement but say choices are harder for users to make

BY ALAN J. RYAN  
CW STAFF

Companies looking at Personal System/2 computers said IBM's latest offerings, the Model 50Z and the Model 70, merit a closer look but that the entries may hurt sales of the original family members.

After spending several weeks digesting IBM's June 2 announcement of the Models 50Z and 70, some MIS managers said they are ready to begin placing orders for them.

"They're very attractive now and are good deals if you want that kind of a machine vs. the older ones," said Jeff Ehrlich, manager of product technology at General Electric Co. in Hartford,

Conn. However, he said, "I feel badly for those who made major investments in the ones they announced last year."

Prior to the announcement, Joseph Vincent, director of technology planning at Humana, Inc. in Louisville, Ky., recommended the Model 50 as the machine of choice at the mammoth health organization. Now, he said, his users have already started placing orders for Model 50Zs, which sell for just \$600 more than the original Model 50s.

### Slow traffic

Tom Jacobs, chairman of the board of Computer Town, Inc., a dealership in Nashua, N.H., said his PS/2 sales in May were quite slow because buyers were antici-

pating price cuts and new models from IBM. Sales have picked up since the announcement, he said.

But now, Jacobs added, buyers face issues such as number of slots vs. storage when trying to choose between the Model 50Z and the older Model 60.

Meanwhile, the more costly desktop PS/2 Model 70s, priced from \$5,995 to \$11,295, will likely make strong inroads during the next year in areas in which desktop power is a major consideration, users said. With just three expansion slots, though, those who need expansion capacity will still be buying the tower-based Model 80s or looking elsewhere.

At North American Philips Corp. in New York, the Model

80s have been a hit, according to Thomas O'Leary Jr., director of MIS technology. Now, with the Model 70, the choices are more difficult, he said.

"The new Model 70 seems to be a technological whiz from a packaging point of view, but I don't know whether if, when the very next 386 PS/2 request comes in, I would get another Model 80 or the Model 70," O'Leary said, because he has not had enough time to effectively evaluate the new box.

### Going 70

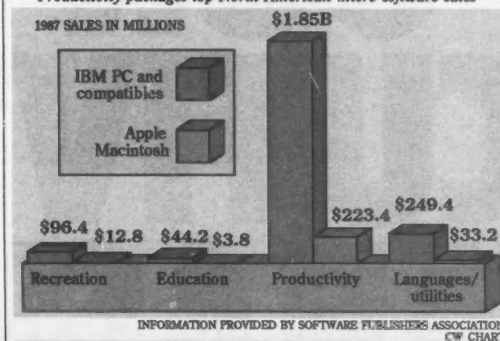
Ed Ginorio, manager of customer computing and support at Dun & Bradstreet Information Systems in Basking Ridge, N.J., said

*Continued on page 40*

## Data View

PCs are not for play

Productivity packages top North American micro software sales



## Firms perch on Microsoft windowsill

BY DOUGLAS BARNEY  
CW STAFF

If Iraq put the amount of effort behind its war with Iran that Microsoft Corp. puts behind Windows, Iraq would be a much larger country.

It was not a bombshell, but nevertheless, a host of software vendors recently put their stamp of approval on Windows/286, Microsoft's latest Windows in-

carnation, by announcing scads of enhanced Windows software. Some even took advantage of Microsoft's recent Windows/286 rollout to announce all-new products.

Unlike earlier versions, Windows/286 uses an extra 50K bytes of random-access memory above the 640K-byte limit of Microsoft's MS-DOS, which lets

*Continued on page 37*

### Inside

- Wells Fargo's Egan gets user-friendly. Page 35.
- Microsoft builds a better mouse. Page 35.
- ALR designs compact workstation. Page 42.

## How Micro Focus COBOL helped the U.S. auto industry get up to date with Just-in-Time Manufacturing

In 1984, Ted Annis and Gail Jackson founded Supply Tech to develop software that would provide communication of business documents between parts suppliers and the major U.S. automakers.

With the release of its ST1 product, Supply Tech had the cost-effective application that suppliers needed to service the Big 3 automakers' mandate for Electronic Data Interchange (EDI) software to make Just-in-Time manufacturing possible.

Annis and Jackson agreed that COBOL was the right choice as their development language. "When used properly COBOL lends itself to self-documentation which means easier implementation and maintenance."

Jackson, Supply Tech's President and head of product development, was already familiar — and dissatisfied — with another COBOL. But Micro Focus COBOL had the mainframe COBOL commands they needed. "Micro Focus also offers additional capabilities via standard routines so that you can do most things in COBOL that you can usually do only from a lower-level

language," Jackson notes. "And no matter how technically sophisticated they are, our mainframe programmers just go crazy over the Micro Focus Editor and ANIMATOR."

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Julie Pitta

Mac heads  
East

The Macintosh has taken on an exotic look with a version running a Chinese operating system.

An add-on board allowing the Macintosh II and SE to run Zhongwen Talk, a Chinese operating system with the Mac interface, has been available since those two personal computers became available in portions of the Far East last year.

Apple says it is hoping that capability will allow it to sell Macintoshes in what market watchers predict will become a huge market opportunity for PC manufacturers. The American Electronics Association has forecast that China will be the largest consumer of computer products by the year 2010.

Apple has been in China since 1985, nearly two years after the U.S. government relaxed controls regarding products exported to the People's Republic of China. One year after those restrictions were relaxed, Chinese companies purchased a wealth of PCs. According to market research firm International Data Corp. in Framingham, Mass., sales of PCs in China hit \$420 million in 1984.

By the time Apple entered the market the following year, large numbers of those PCs sat unused in warehouses, industry watchers say. The Chinese

*Continued on page 36*

Wells Fargo exec locks in PCs,  
seeks bulletproof reliability

Tom Eagan is a plain-spoken New Yorker who says he likes to think of himself as a "get-it-done" manager. His colleagues at Wells Fargo Bank NA would likely agree after watching Eagan implement a \$1.5 million program to automate the bank's 24 branches about 18 months ago — shortly after he signed on with Wells Fargo.

An MIS executive for more than a decade, Eagan calls the Wells Fargo automation project his finest moment. As part of that massive program, Eagan supervised the installation of 700 personal computers at the branch offices and the microcomputer training of the bank's branch personnel.

Not only did it earn him kudos from his employers, but he also collected \$250,000 in California state funding for Wells Fargo under the Employment Training

**I**'M NOT convinced of what [the Micro Channel] is or what it does. It's a real 'show-me.'"

TOMEAGAN

Act, passed by the state's legislature in 1982. Under that legislation, California reimburses employers for their training expenses when they teach valuable skills.

Eagan, Wells Fargo's vice-president and manager of integrated office support systems, recently spoke with *Computerworld* West Coast senior correspondent Julie Pitta about the project and microcomputer purchasing decisions at Wells Fargo.

## What is your process for selecting a PC?

We provide services to 700 users, so I'm constantly looking at different kinds of PCs. It's not really any strict process. The things we're interested in are protecting our current technology investments, a good corporate relationship with our supplier and maintaining standards.

When we're interested in a particular technology, we go to our major vendors — Tandy, Computerland and Gateway — and see what they have to offer. Then we go into test mode. We take those products and run them in an R&D laboratory looking at things like speed and quality.

After we finish testing, we take the top three or four products and do a corporate analysis. We study the market and see who's been selling the most and

*Continued on page 40*

Freeze! PC  
tool draws  
mug shotsBY ALAN J. RYAN  
CW STAFF

CAMPBELL, Calif. — When a person witnesses or falls victim to a crime, it is often difficult for police to create an accurate composite sketch of the perpetrator; victims and witnesses can sometimes unknowingly be influenced by mug shots and wanted posters they may see.

However, composite sketches made within hours of a crime often prove quite helpful to police in their search for the perpetrator. With this in mind, Campbell, Calif.-based Visatex Corp. has introduced a software package to help law enforcement agencies develop more accurate composite sketches.

The package, Compusketch, recently became available for

*Continued on page 37*

## SOFT TIPS

## Get your record back

Even the best data base jockeys can accidentally delete a record.

If you wish to recover an accidentally deleted record from within Dataease International, Inc.'s Dataease, go into View and then press Ctrl F3.

A message will appear at the top of the screen asking which record you would like to view. In order to restore a

deleted record, you need to know the record number.

When you enter the number of the deleted record, the record will appear on the screen.

Press F8 to modify it; this process will also resave the record.

Information provided by Corporate Software, Inc., a Westwood, Mass.-based software reseller.

## Building a better mouse?

Microsoft device has scrounged a million sales

BY STEPHEN JONES  
CW STAFF

REDMOND, Wash. — In an industry where everyone strives to build a better mousetrap, Microsoft Corp. has apparently solved the first half of the equation.

The developer claims its Microsoft Mouse has been so successful that some one million customers have beaten a path to its door since 1986. In fact, sales have more than doubled each 11

*Continued on page 36*



Microsoft's Jon Shirley watching the rat race?

## TCP/IP - TODAY'S SOLUTION

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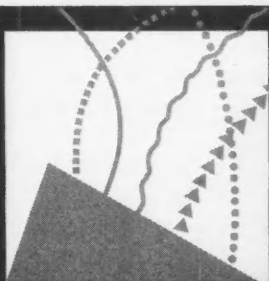
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## Pitta

FROM PAGE 35

lacked the training to use the machines and the support mechanisms to service them. Purchases of PC products dropped off in 1985 and 1986.

"Apple knew it wouldn't sell many Macs," says Apple spokeswoman Laura Elmore. "They didn't have a product for the market. The Mac they were selling there was for English-speaking users."

The early Macintoshes didn't have the memory to accommodate Kanji, the charac-

ter set composed of the different dialects of the Chinese language. It wasn't until the Mac II and SE were introduced last year that Apple could offer systems with the 1M byte of random-access memory and expansion slots needed to add the Chinese operating system.

Pitta is *Computerworld's* West Coast senior correspondent.

"CHINA hasn't been very good at developing products. They lag about 10 years behind."

LAURA ELMORE  
APPLE COMPUTER, INC.

Since those two products were introduced last year, Apple has made special efforts with its Far East customers. Recently, the company reorganized, creating a Pacific Rim marketing group. It signed on two China-based distributors last year.

Apple officials led the firm's important third-party developers on a tour of China last year in the hope of interesting them in porting their packages to the Chinese. China has lacked applications software packages for PCs because it has little software development activity.

Complicating the market for third parties is the fact that China has three dominant dialects — Shanghaiese, Mandarin (spoken in Peking) and Cantonese (spoken in Southern China). Shanghai, often called the New York City of China, and Peking, the capital, are considered to offer the best opportunities.

"China hasn't been very good at developing products," Elmore says. "They lag about 10 years behind. They need localized products."

So far, Apple's software subsidiary, Claris Corp., has adapted Macwrite and Macpaint to Chinese. Also, Microsoft has introduced a Chinese version of Excel. In addition, Apple is establishing a support structure of third-party developers in China, according to Elmore.

Despite the complexity of the Chinese market and the chal-

## Mouse

FROM PAGE 35

months since July 1986, according to Rich Abel, group product manager for hardware.

Abel attributed the sales success in part to a redesign of the Mouse in August 1987. It may sound like the description of a luxury automobile, but Micro-

soft uses words like "comfort, aesthetics and intuitive ease-of-use" to describe the \$150 device. According to some sarcastic observers, the most recent Mouse sports better aerodynamics than any ever made.

Microsoft said that during the last six months, it has seen the Mouse's customer base shift from home users to business customers as graphics-based appli-

cations gain more acceptance in corporate America.

Approximately eight out of every 10 Mouse users currently buying the device are business users paying with company money, according to Abel.

Although Microsoft is leading the mouse industry, other companies such as Logitech, Inc. and Mouse Systems Corp. continue to nibble away at the market.

# Everybody talks OLTP. Tandem does it.



## Microsoft

FROM PAGE 33

users plug in more data and allows applications to run more quickly. However, to use this feature, machines must have more than 1M byte of extended memory available.

The product will run on lower end Intel Corp. 8086 and 8088

machines but will not provide the extra 50K bytes of RAM and, like all versions of Windows, will not perform adequately on this class of machines.

Leading the applications charge was Information Builders, Inc., which said its next release of Level 5/PC and expert system development program will support Windows.

Better Software Bureau in

Lyndhurst, N.J., released software that converts on-line data into complex reports without programming. Dubbed Exec. Reporter, the software sells for between \$40 and \$80. For managing files on a hard disk, Access Softek of Berkeley, Calif., released the \$79 Prompt.

Many firms announced support for the new Windows product. These firms include such

Windows notables as Aldus Corp., which said Pagemaker 3.0 runs 20% to 30% faster with Windows/286.

Updates of existing Windows software were plentiful. Windows maven Micrografx, Inc. shipped Designer 1.2, a \$695 personal computer illustration package that rivals Adobe Systems, Inc.'s Illustrator for Apple Computer, Inc.'s Macintosh.

## Freeze!

FROM PAGE 35

IBM and compatible personal computers and IBM Personal System/2s running Microsoft Corp.'s Windows. The original version works on Apple Computer, Inc.'s Macintosh.

By using the features of Windows, police departments have a tool they can run on their existing personal computers while incorporating ease-of-use features such as pull-down menus and program control with a mouse, according to Don Sumner, president of Visatex.

The software contains more than 40,000 features in a library of facial components and accessories, such as hats, glasses and jewelry. According to Sumner, even an operator with no artistic ability can generate sketches using the package.

To select the proper features, the system incorporates an interactive witness interview.

### Merit badge

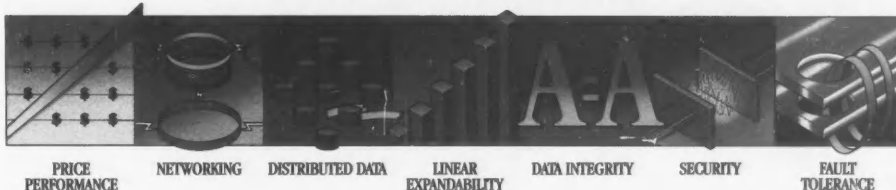
"From a law enforcement point of view, the interview process built into the system is good," said Gerald Clough, an investigator at the Lockhart Police Department in Lockhart, Texas.

Clough said that with non-computer-based composites, witnesses often select facial features from a whole page of sketched features. "Sometimes they don't have a good recollection but they'll end up choosing something anyway."

With the Windows-based system, the user is not shown groups of features. Rather, the composite is formed through descriptions the witness gives during an extensive interview. Both the interview process and feature images were designed by a police artist based on 10 years of investigation experience in a major metropolitan police department, Sumner said.

"In an agency of our size, there is no way we could have a forensic artist on staff," Clough said. "This provides us with that ability." Priced at \$4,000, the software is certainly less costly than a full-time staffer.

## OLTP fundamentals.



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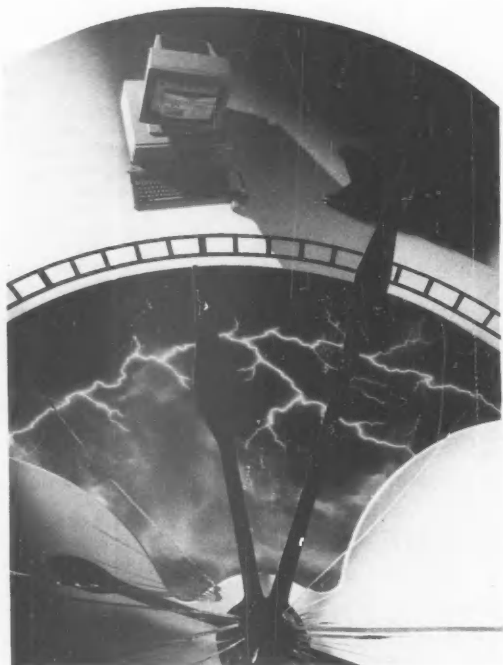
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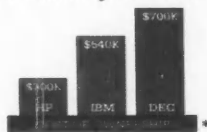
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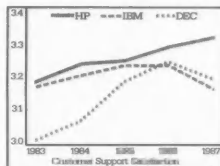
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## Wells Fargo

FROM PAGE 35

why. When we make a decision, we like to stick with it for a year and a half.

### What is the single most important factor in your decisions?

Long mean-time between failures. We want to keep it out there for two to three years without any major problems. Second is service.

### What products is Wells Fargo standardizing on?

Our workstations are Tandy's 286s. Our file servers are AST Premium Model 80s, which we purchased from Computerland, also 286 technology. We're looking at 386 technology, but we haven't made any purchasing decisions yet.

### How did you select Tandy?

About a year and a half ago, we looked at five or six vendors as part of a \$1.5 million program to automate our branch offices, connecting them with our mainframe at the corporate headquarters. We decided that it had very good price/performance — not the best, but it was very good. That combined with what I felt was Tandy's commitment to serving us as a corporate customer. I actually went to Fort Worth to meet with senior Tandy executives. We were able to negotiate a service deal.

We weren't convinced by the Tandy server. It didn't have the performance we were looking for. So we went to Computerland for the AST product.

### How are microcomputers being implemented at Wells Fargo?

They're part of our integrated office support system to provide PC tools to our commercial lending branches at 24 different locations. The PCs are all connected within the regional offices and are all networked with a 3Com LAN. Through a leased line, they access our bank's mainframe system, an IBM 3090. They allow loan officers at our branches to conduct lending analysis. We use them to document loans, do portfolio analysis and to communicate lending decisions.

### What did you have before?

We had stand-alone PCs that were basically clerical machines. There was no penetration into the commercial loan offices.

### How have they changed Wells Fargo?

We see a productivity improvement and better documentation of loans. In a pilot program, we demonstrated a productivity savings of 10 hours per month per loan officer.

### How important is IBM's Micro Channel to your future purchases?

I'm not convinced of what it is or what it does. I'm not convinced that it offers me any real performance benefits. It's a real "show-me."

### What are you looking at in terms of new technologies?

A more user-friendly way of downloading from the mainframe. Our biggest thing is data base administration so we can provide our users with good solid data from the systems. We're developing our own in-house applications for the mainframe and also building things like menus, windows and tools that allow us to access the mainframe in a more user-friendly fashion.

## Attention

FROM PAGE 33

he considers the application before making purchase decisions.

For Cheryl Currid, manager of departmental computing at Coca-Cola Foods in Houston, any PS/2s she purchases will be either Model 70s or 80s, because Coca-Cola is standardizing on

the 80386 processor.

However, Currid said at this time, the IBM offerings are improving but still do not correctly fit her needs. With the Model 70s, she said, the 60M-byte fixed disk is too small to be used as a file server but too large for localized storage because of her policy to keep as much storage as possible on the company's local-area network.

The next generation of desktop computing will let us merge data from different sources into a useful flow of information.



## Barney

FROM PAGE 33

ter, like OS/2. A few hands shot up, but most stayed down. I then asked how many were sick and tired of Lotus's 1-2-3 and wanted something better. A few more hands shot up, but again, most stayed down. Then I asked how many were sick and

tired of Ashton-Tate's Dbase and wanted something better. Hands shot up so fast that a doctor was called in to treat dozens of dislocated shoulders.

This sounds bad for Ashton-Tate, but 'tain't necessarily so. If Dbase IV answers these users' frustrations, the firm will maintain a lock on the market. But if the product doesn't soothe users' woes, then a broad range of

competitors stand to gain market share at Dbase's expense. Now that's pressure.

**Fault-tolerant PCs.** Have you heard about these new Personal Information Managers that are supposed to clear our desks of clutter? They sound great, but vendors selling these products have forgotten about the bane of any MIS existence

— system crashing.

What would happen if all our notes, scraps of paper and phone numbers were on a hard disk that just died? That's right. We'd be completely lost.

Now, we realize that hard disks should be backed up on floppies or tape, but sometimes people forget. What we really need are fault-tolerant PCs. That way, one can feel secure

turning mountains of paper — which burns but rarely just up and disappears — into electronic form.

**Sybase fights back.** Recently, this space was used to let Oracle tee off on rival Sybase. Specifically, Oracle's Gene Shklar took Sybase to task for alleged deficiencies in its unshipped SQL Server product. Shklar was particularly critical of that product's supposed inability to talk to other servers.

Well, last week we got a call from a Sybase public relations spokeswoman who said that since SQL Server isn't shipping yet, Sybase really could not comment on Shklar's remarks.

But come to think of it, she said, Oracle has no idea what SQL Server will be, and a lot of things Oracle said are not true.

For example, SQL Server will join files from different server data base management systems, just not transparently. "The focus is on on-line applications," she said. "What customers really want is to update two different data bases on two different computers." Users can do distributed joins, but they have to specify what data base and where.

Shklar had also criticized the upgrade path from SQL Server and asked how users could move up when a single server just didn't cut it anymore.

Again, Sybase couldn't comment but at the same time, could. Users today can upgrade from a Sun to a VAX without changing code, the spokeswoman said, implying that you could just as easily upgrade from a personal computer to a Sun to a VAX.

Anyone from Oracle care to comment?

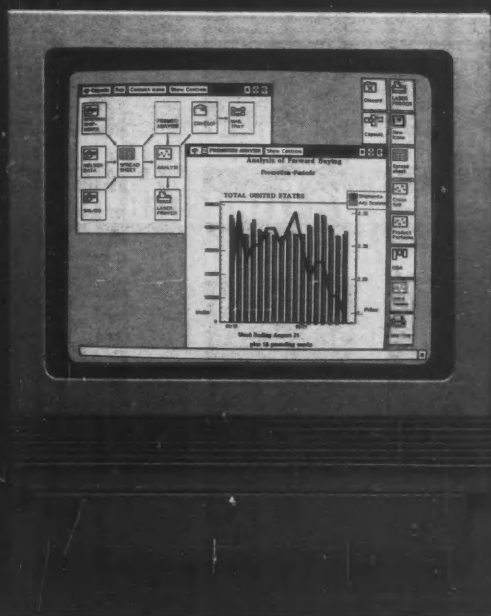
**IBM vs. IBM.** Add the 1987 revenues of Lotus and Microsoft together and you'll find these two firms account for more than a third of the total sales of the top 100 PC software firms. But both want more, and each needs to hurt the other to get it.

Lotus's latest secret weapon is Frank King, a former IBM exec who now heads up all software development. King's counterpart at Microsoft was none other than Bill Gates, chairman and vice-president of applications, possibly the most over-worked billionaire in America.

But Microsoft is fighting IBM with IBM and has hired Mike Maples, the respected former director of software at IBM's Entry Systems Division, as vice-president of applications.

We just hope these former IBM guys can keep those creative juices flowing from software developers that think a suit and tie cuts off all blood flow to the brain.

Barney is *Computerworld's* senior editor, microcomputing.



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## NEW PRODUCTS

## Systems

**Advanced Logic Research, Inc.** has announced **Flexnode**, a 20-MHz Intel Corp. 80286- or 80386-based workstation that reportedly occupies 4½- by 15-in. of desk space.

The machine was designed with zero-wait state page-interleave memory architecture. It comes standard with a 3½-in. 1.44M-byte IBM Personal System/2-compatible floppy disk drive and four 16-bit slots. The 80286-based model has 512K bytes of random-access memory on

the CPU card, expandable to 5M bytes. On the 80386 system, 1M byte of RAM is standard, expandable to 13M bytes.

Flexnode 286 costs from \$1,990 to \$2,990. Flexnode 386 costs from \$3,490 to \$4,449. Price is dependent on memory configuration.

Advanced Logic Research, 10 Chrysler, Irvine, Calif. 92718. 714-581-6770.

**Compulink Management Center** has released an integrated document search, update, archival and retrieval system that uses laser technology.

The **Laserfiche Model 3000** con-

sists of a 32-bit processor running at 20 MHz with 2M bytes of random-access memory. Storage configurations include 340M-byte hard disks, an 800M-byte write-once read-many optical disk, a 60M-byte streaming tape drive, an intelligent character-recognition optical scanner and a desktop laser printer, according to Compulink.

The system was designed to replace existing office items such as microfiche, computer data entry, data base management systems, paper copies and filing systems, the vendor said.

The **Laserfiche Model 3000** has a price tag of \$45,000.

Compulink, Suite A106, 350 S. Crenshaw Blvd., Torrance, Calif. 90503. 213-212-6820.

## Software applications packages

**Computer Associates International, Inc.** has released **Accpac BPI Accounting Lanpak**, a package that reportedly allows multiple users to share accounting resources.

The product will permit as many as eight users to access, edit or view account, customer or vendor data simultaneously. The system runs on Novell, Inc.'s Novell Advanced Netware and Novell ELS, 3Com Corp.'s 3+ and IBM's PC Network local-area networks.

Accpac BPI Accounting Lanpak costs \$395.

Computer Associates, 1240 McKay Drive, San Jose, Calif. 95131. 408-432-1727.

## Data storage

**NEC Home Electronics, Inc.** has made an entry into the compact disk/read-only memory (CD-ROM) market with the announcement of its **Intersect** line of CD-ROM readers, four interface kits and two CD-ROM software disks.

The NEC CD-ROM readers come in external and half-height internal models. The **Intersect** external model, the **CDR-77**, is IBM Personal Computer XT-, AT- and Personal System/2-compatible. It also supports NEC Multispeed Laptop computers and the Apple Computer, Inc. Macintosh architecture. The **CDR-77** costs \$999.

The **Intersect** internal model, the **CDR-80**, is a half-height unit that fits in IBM XT, AT and compatibles and IBM PS/2s with a standard 5¼-in. form-factor mount. The **CDR-80** costs \$899.

The NEC CD-ROM readers can plug into a computer system using one of four interface kits. Each provides device drivers; PC kits include a small computer systems interface card. The kits cost \$199 each.

The company has also released two CD-ROM disks for users of desktop publishing and presentation graphics. The **Clip Art 3-D** reportedly contains several thousand three-dimensional images and fonts that can be customized by users. The **Image Folio** disk is said to contain more than 4,000 video images. Each software package costs \$399.

NEC Home Electronics, 1255 Michael Drive, Wood Dale, Ill. 60191. 312-860-9500.

## Board-level devices

**Rabbit Software Corp.** has announced a personal computer add-in board set that offers PC-based controller capabilities.

The **Rabbitcluster** board series is designed to run on IBM Personal Computers, PC XT's, AT's and Personal System/2 Models 25 and 30.

The **Rabbitcluster** reportedly combines the functions of an IBM 3270 coaxial cluster controller and an ASCII protocol converter into one two-board add-in set. The set supports up to 16 attached devices and includes IBM 3299 multiplexer support.

The **Rabbitcluster** costs from \$2,390 for the two-board set; the add-in boards may be purchased separately for a price of \$1,195.

Rabbit Software, 7 Great Valley Pkwy E., Malvern, Pa. 19355. 800-722-2482.

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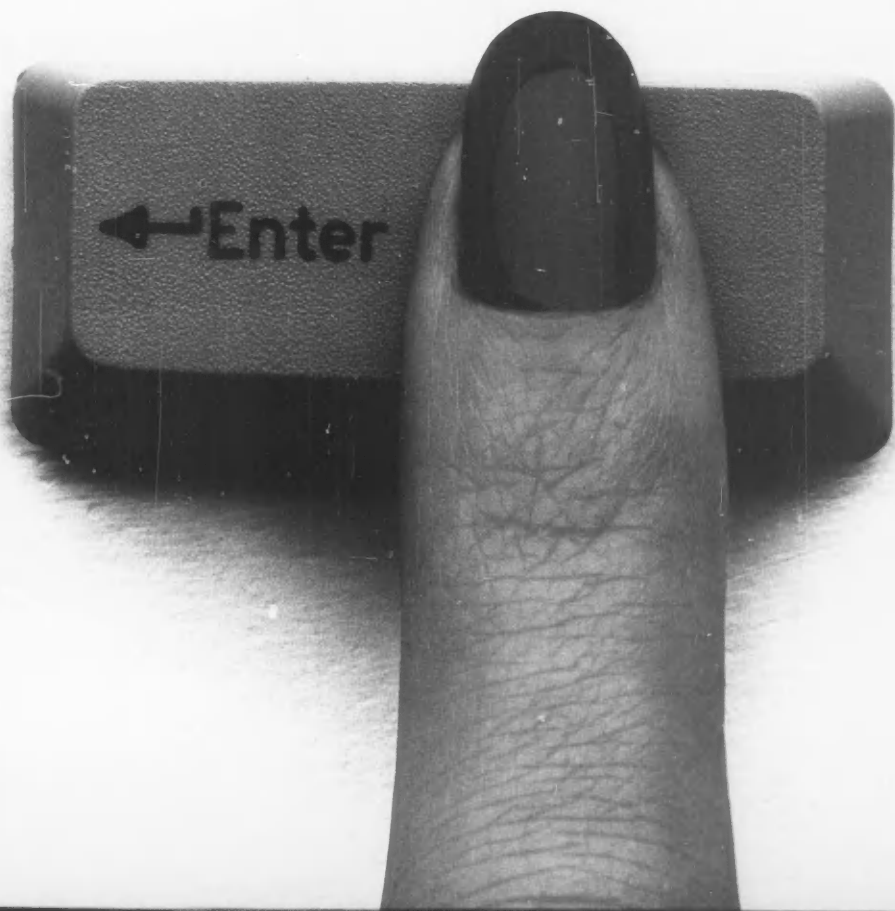
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Now, we're introducing the new COMPAQ DESKPRO 386s and COMPAQ DESKPRO 386/25. And extending our high-performance 80386 line in both directions. To meet the increasing demands of today's general business users *and* to provide our power users with more power than ever. So *everyone* can enjoy the speed and future capabilities of 80386 computing.

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The new COMPAQ DESKPRO 386s is the first personal computer designed specifically to let general business PC users head straight for the performance and potential of 80386 personal computing.

For more advanced applications, the original COMPAQ DESKPRO 386 and the COMPAQ DESKPRO 386/20 deliver even higher levels of performance.

And now at the top of our line is the COMPAQ DESKPRO 386/25. The most powerful personal computer available.

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Now, breakthrough technology from Compaq brings the power and potential of 80386-based personal computing to millions of business PC users. The first personal computer powered by the new Intel 386SX\* microprocessor, the new COMPAQ DESKPRO 386S is designed specifically as an affordable, high-performance alternative to 80286-based PC's.

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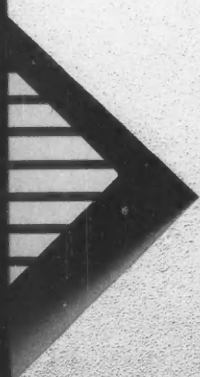
So you can easily tailor it to your exact needs. Choose from fast 20-, 40-, and 110-Megabyte Fixed Disk Drive options; 5¼-inch and 3½-inch diskette drives; even tape backup options.

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You'll also find two more standard features: the same sophisticated engineering and uncompromising quality that set all COMPAQ 80386 computers apart. So head for the performance you really need for today's applications. And the 80386 potential you'll need for tomorrow's. With the new COMPAQ DESKPRO 386s.



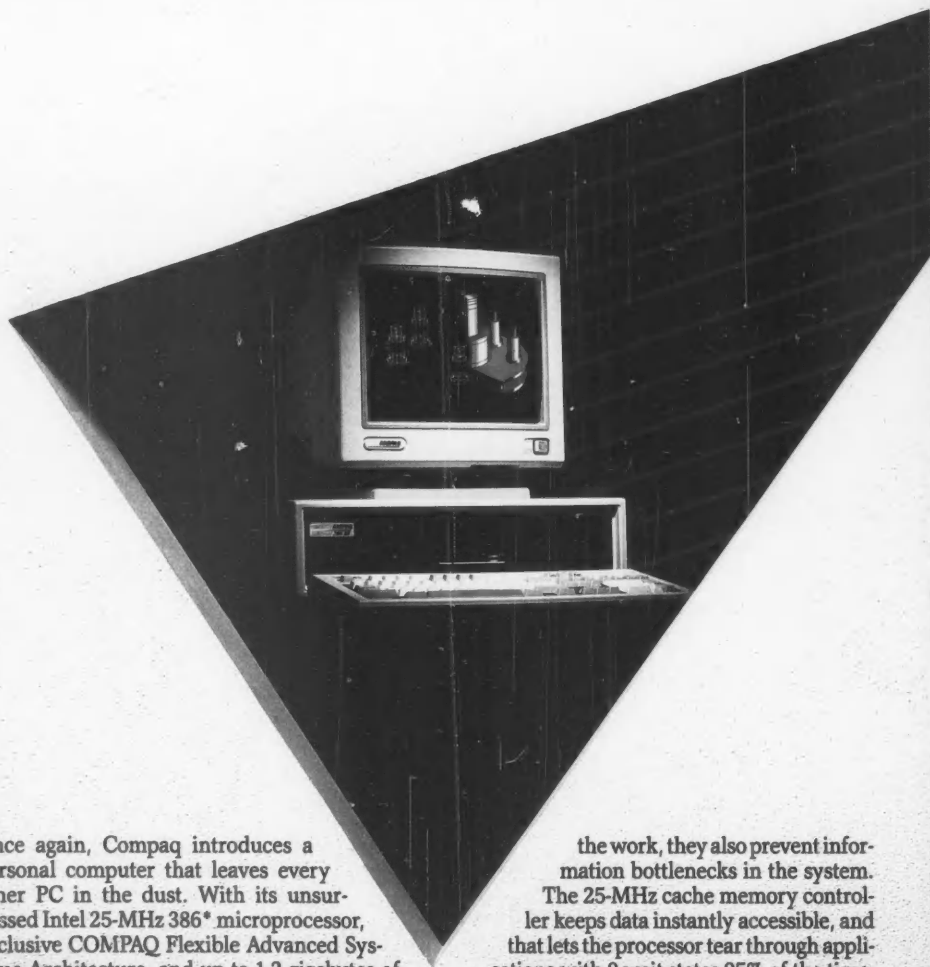
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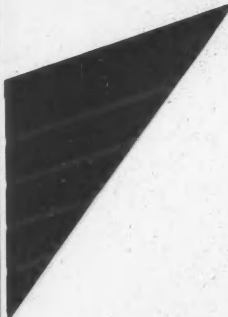
Its FLEX Architecture uses separate memory and peripheral buses operating in concert to reach maximum system performance, while maintaining compatibility with industry-standard hardware and software. By splitting

the work, they also prevent information bottlenecks in the system. The 25-MHz cache memory controller keeps data instantly accessible, and that lets the processor tear through applications with 0 wait states 95% of the time.

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You can go from one megabyte of standard, high-speed memory all the way to 16 megabytes. And for storage-hungry applications, such as networks using disk fault tolerance and multi-user systems, the COMPAQ DESKPRO 386/25, with two optional COMPAQ 300-/600-Megabyte Fixed Disk Drive Expansion Units, is able to provide up to a massive 1.2 gigabytes of high-performance storage. With an average access time as low as 20 milliseconds.

Of course, we give you a choice of 5¼" or 3½" diskette drives and high-capacity tape backup options.

For sophisticated PC users who require the ultimate in power, compatibility, connectivity and overall system performance, no other personal computer comes close to the new COMPAQ DESKPRO 386/25.

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# NETWORKING

## DATA STREAM

Patricia Keefe

### Banyan looks hard at OSF



**Will they or won't they?** The Open Software Foundation (OSF) may soon pick up support from Banyan

Systems, a supplier of Unix-based file server software.

Noting that the OSF appears to be building on Unix and associated components as a standard, Banyan President Dave Mahoney suggests that supporting OSF "looks like an interesting way of moving Vines [Banyan's Unix-based network operating system] ahead faster."

The idea is that Banyan has Unix expertise that might be of interest to the OSF, and should the group develop a standard that could impact Vines, it wouldn't hurt the local-area network vendor to have some input in that process. Mahoney concedes there is a slight chance Banyan might move toward adopting whatever standard arises from the forum.

He also suggests keeping an eye on the company in the next two months as it works to reposition itself for 1989 and 1990. Capabilities to be addressed now that Vines 3.0 is out include new areas of naming and directory services, as well as a stronger push into data bases.

"We are talking with Sybase and some Unix-based data base companies," Mahoney says, adding that Vines provides an attractive platform on which to port data base management

*Continued on page 47*

## TCP/IP-to-OSI road has fork

BY ELISABETH HORWITT  
CW STAFF

Users could find their TCP/IP-to-OSI migration courses complicated by the fact that the industry remains divided between two rival proposals: the U.S. Department of Defense's OSI Implementation Strategy and the International Standards Organization's (ISO) Development Environment.

The DOD's strategy, expected to be officially released this summer, allows Transmission Control Protocol/Internet Protocol (TCP/IP) and Open Systems Interconnect (OSI) networks to coexist but prohibits mixing the two protocol types on the same network, according to

Kevin Mills, the National Bureau of Standards' (NBS) chief of systems and network architecture.

One reason for this prohibition is to encourage users to shift to a complete OSI network rather than linger in a halfway state in which OSI applications run on top of TCP/IP, said Daniel Lynch, president of Advanced Computing Environments Co. and a TCP/IP co-developer.

Communications between the two types of networks would take place through gateways that would translate between DOD applications — such as Simple Mail Transfer Protocol and File Transfer Protocol (FTP) — and equivalent OSI applications, X.400 and FTAM.

The NBS and Mitre Corp.

have developed and are testing such gateways, with specifications likely to be released by the end of the year, according to sources.

The DOD strategy's rival, the ISO Development Environment, provides "glue to plug into a TCP system and run OSI applications, so you can experiment without having to build a separate network underneath," Lynch said.

The debate as to which approach is better is heating up. ISO Development Environment supporters claim that the DOD's approach is memory- and CPU-intensive, since it requires gateways to support the full set of OSI and TCP/IP protocols.

*Continued on page 44*

## System ties both ISDN interfaces

BY ELISABETH HORWITT  
CW STAFF

EATONTOWN, N.J. — Teles Communications, Inc. recently introduced the Integrated Applications Processor 6000 (IAP6000), reportedly the first communications system to support connections that adhere to both the Integrated Services Digital Network (ISDN) Basic Rate and Primary Rate Interfaces.

The 64K bit/sec. Basic Rate Interface typically links local voice and data devices; the Primary Rate Interface provides 1.5M bit/sec. connections to hosts and private- and carrier-based long-distance networks.

The IAP6000 forms the basis of two newly announced Teles systems. ASK300 includes an AT&T Unix System V, Release 2 application development environment. With this, users can implement customized routing, concentration, voice/data integration and other functions on the IAP6000, according to Teles.

For example, the processor could accept transmissions from telephone sets and workstations equipped with ISDN Basic Rate Interface cards and concentrate these lines over a Primary Rate Interface to a host or ISDN

*Continued on page 47*

## PURCHASING STRATEGIES

### You too can buy a T1 mux and live to tell the tale

BY KATHY CHIN LEONG  
CW STAFF

**Y**our company's top management has gotten the bright idea of saving telecommunications costs by substituting leased T1 lines for a multitude of voice/data channels. Commissioned with the task of finding the right equipment to do the job, you call your local T1 multiplexer supplier. Then, things start to get confusing.

"What kind of T1 multiplexer do you want?" the sales representative asks. "For how many lines? Do you want to integrate voice and data? How about voice compression? Do you want one that uses ADPCM?"

You slam down the phone in a cold sweat. You, Mr. Communications Expert, suddenly

*Continued on page 45*



HAL MAYPORT

#### Inside

- Coordination Technology outlines groupware. Page 44.
- Alisa, Microsoft shake hands on Mac mail. Page 46.
- Future has SCSI support for Netware. Page 48.

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# Package helps coordinate jobs on networked microcomputers

BY ALAN ALPER  
CIVIL STAFF

TRUMBULL, Conn. — Coordination Technology, Inc. recently outlined plans for software said to help users coordinate integrated tasks located on microcomputer networks. The groupware package is slated for release next summer.

Coordination Technology's package will provide a framework that guides work groups through the most effective

means of completing jobs, the vendor said. It will also facilitate the transfer of information between co-workers on networked micros and provide automatic prompting when specific items need to be acted upon.

"Our aim is to shrink the amount of coordination effort to allow users to have more time available for the execution of their tasks," said Roger Moody, the company's president.

The coordination environment will

come in two pieces: a shell to manage computing resources and a component to map out the interactions of the work group.

Users will be able to run existing office automation packages such as Lotus Development Corp.'s 1-2-3 within the coordination environment, the vendor said.

## OS/2 support

The package will be developed for networked Intel Corp. 80286- and 80386-based micros running IBM and Microsoft Corp.'s OS/2 multitasking operating system.

Software platforms to be supported in August 1989 include OS/2 with Microsoft's LAN Manager, 3Com Corp.'s 3+ Open and IBM's OS/2 Extended Edi-

tion with the Lan Server, according to Coordination Technology.

The package will be written in the C language, which provides ease of porting to other hardware and software platforms. The company said it expects to release versions for Digital Equipment

**O**UR AIM is to shrink the amount of coordination effort to allow users to have more time available for the execution of their tasks."

ROGER MOODY

COORDINATION TECHNOLOGY, INC.



*"Look, I understand why we need to connect your network to my IBM system; let's just make sure the software we choose doesn't affect next week's payroll run."*

**You've been told the IBM MVS host and SNA system you manage must be connected to engineering's TCP/IP network.** But which package offers both sets of users the features they want without compromising your ability to manage system resources? Which package?

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Office automation analyst Amy Wohl said Coordination Technology's approach is similar to other procedural processing products developed by companies such as Metaphor Corp. and FileNet Corp., which attempt to coordinate group activities toward a known end.

Coordination Technology has laid a good framework, Wohl said, but it remains to be seen if the company will supply generic applications or provide tools for users to develop applications to unlock the power of its coordination environment. "I liked what I saw, but I'd like to know more," she said.

## TCP/IP

CONTINUED FROM PAGE 43

Another potential advantage of the ISO approach, according to Lee Labarre, lead engineer at Mitre, is that it allows users to find out for themselves the greater functionality they can get from OSI applications.

For example, OSI FTAM allows access to individual records, and TCP/IP's FTP allows only transfer of whole files, Labarre said.

The NBS's Mills responded that the DOD approach also enables users to experiment with OSI functions without having to scrap their older TCP/IP networks. It also encourages users to "buy full OSI protocols instead of home-brewed R&D hacked-up things," he added.

## No shoo-in

So far, there is little indication that the DOD strategy will automatically become the standard — even for government organizations.

The National Science Foundation, for example, said it prefers the ISO approach. This is because it enables users to experiment with the newer ISO applications while preserving "all of the standard [DOD-based] stuff people are familiar with" on the lower networking levels, according to the foundation's Director of Networking Steven Wolff. "When people are comfortable, we can slide the TCP out from underneath and substitute ISO," he added.

Fortunately, several vendors have revealed their plans to provide gateways that incorporate both the DOD's and the ISO's recommended approach, so users should be able to choose their migration paths.



# T1 mux

FROM PAGE 43

realize that this isn't going to be as easy as you thought.

Relax. The following descriptions of users who have successfully purchased T1 multiplexers should help clarify your task. But first things first: You've got to know what you're looking for.

## What is a T1 multiplexer?

A T1 multiplexer is a communications processor that takes local transmissions from voice and data devices and passes them over one or more 1.5M bit/sec. T1 lines. Such a device should provide alternate paths when a line goes down and the ability to divvy up the number of channels and speeds for voice and data.

T1 multiplexer purchasers may be confounded for several reasons. First, novice users of T1 lines have a difficult time determining what their needs are (see story below). Second, the number of features offered today is mind-boggling. While many of the products are designed to handle voice and data equally well, certain T1 multiplexers specialize in one type of transmission.

There are commercial T1 standards for dividing a 1.5M bit/sec. line into 24 (Pulse Code Modulation) or 48 channels (Adaptive Differential Pulse Code Modulation), but many vendors tend to use proprietary voice/data compression techniques that squeeze every usable piece of bandwidth onto the line.

Thus, the technology has not been standardized to the point at which users can mix and match different vendors' multiplexers

on a T1 network. According to David Owen, director of product marketing at Stratacom, Inc., while T1 multiplexers can all support the Bell interface standards to tap a T1 line, "the upper layer protocols are not standardized, and that's why you have to go with one vendor."

## Three who've done it

Clearly, choosing a T1 multiplexer is no easy task, but three users — Westinghouse Electric Corp., Travelers Insurance Co. and First Interstate Bank of Washington — have ample experience in T1 networking, and each found vendors well suited to their needs.

A product that adhered to the Bell interface standards was critical when Westinghouse made its multiplexer decisions. Westinghouse was a pioneer in implementing voice/data integration across digital T1 lines in 1983. When the Pittsburgh, Pa.-based company decided to venture into an all-digital voice/data communications environment, that meant the first-generation analog Aydin Corp. multiplexers, which had limited proprietary features, had to go.

Westinghouse's selection of 13 CP 2000 multiplexers from DSC Communications Corp. in Santa Clara, Calif., followed extensive in-house market research. A proposal was submitted to the Westinghouse Standards Committee, which gave DSC a thumbs-up.

In the decision-making process, Westinghouse wanted to adhere to commercial T1 standards, particularly ADPCM, the encoding standard supported by the Consultative Committee on International Telephone and

Telegraph.

Jim Sever, Westinghouse's manager of networking engineering of communications systems, says, "We needed a vendor that would be very flexible and which had a product that conformed to different pieces of equipment," such as the various components of the company's computer systems — including local-area networks and mainframes. And since Westinghouse has more than 200 T1 trunks, built-in redundancy was also pivotal in the selection routine.

The move to integrate voice and data has been a boon for the company, Sever says. While 20% of the traffic over T1 links is data and the rest voice, he says the company plans to increase facsimile and video traffic in the next few years.

Despite the pluses associated with DSC, Sever readily admits to certain features that are lacking. For one thing, the multiplexer does not support Group III standard facsimile machines, on which the company has standardized. Second, the product's network management support does not extend to other vendors' equipment as required by Westinghouse.

While standards were key criteria for Westinghouse, speed and reliability topped the list at Travelers. The Hartford, Conn., insurance company has begun to install 11 Network Equipment Technologies, Inc. (NET) Integrated Digital Network Exchange (IDNX)/20s, NET's smallest time-division multiplexer. According to Tom Calabrese, Travelers' assistant director of telecommunications, 70% of the T1 backbone network is used for data, with the remaining 30% used for voice.

In late 1986, when Travelers was looking for a series of multiplexers to replace its point-to-point General Datacomm Systems, Inc. devices, the company established several criteria, Calabrese says. The insurance firm needed a product that, in case of circuit failure, would reroute data and voice calls to another circuit in less than 30 seconds.

Travelers, which has 20 T1 links, also required built-in redundancy, dynamic bandwidth allocation and strong technical support. According to Calabrese, NET's IDNX box is able to isolate problems within the multiplexer so that the rest of the network is not affected. In addition, the device can automatically reroute calls without preprogramming. While the dynamic bandwidth allocation feature is common today, Calabrese says few vendors offered it in 1986.

Like Westinghouse's Sever, Calabrese has his own wish list for further multiplexer enhancements. Redwood City, Calif.-based NET sells a network management tool called INCS that runs on a Sun Microsystems,

## T1 or not T1?

Users groups can be a valuable resource for T1 investigation and research\*

### • AT&T Accunet T1.5 Users Group

By invitation only  
Contact: Local account executive

### • Digital Communications Associates T1 Users Group

c/o Chase Manhattan Bank  
13th Floor  
One New York Plaza  
New York, N.Y. 10081  
(212) 676-3041  
Contact: Victoria Blackford, vice-president, data communications

### • Independent T1 Users Group Association

P.O. Box 7514  
McLean, Va. 22101  
(703) 734-7050  
Contact: Karen Dickson

### • Network Equipment Technologies Pushnet

400 Penobscot Blvd.  
Redwood City, Calif. 94063  
(415) 366-4400  
Contact: Lyn Coyle, NET user liaison

### • Stratacom Fastpacket IPX Users Group

c/o United Stations  
2200 E. Golf Road  
Des Plaines, Ill. 60016  
(312) 699-5000  
Contact: Bernie Schneider, vice-president, communications

\* This is a partial listing of T1 users groups

CW CHART

Inc. Sun-4 workstation. Calabrese says he would like to see NET port INCS with IBM's Netview net management system to an IBM Personal System/2, since Travelers is an IBM shop.

Calabrese also says that a smaller IDNX box — one that supports fewer than 10 lines, for example — would be an asset to Travelers. The company may be able to bring a single T1 line into a small branch, he says, and give those users the same advantages as those in the home office.

## Different motives

While network configuration and management features were a top priority at Travelers, First Interstate of Washington in Seattle needed a multiplexer that could successfully support integrated voice and data.

Stuart Browne, vice-president of communications, runs a statewide T1 network that supports various bank branches. This year, the bank installed multiplexers from Campbell, Calif.-based Stratacom, which specializes in packaging voice and data over T1 lines. The bank has invested \$300,000 for four nodes.

"We did a one-year analysis to determine what to do with T1 before we got into it," Browne recalls. Prior to leasing the lines, the company ran separate point-to-point voice/data networks. While the company's services subsidiary, First Interstate Services Co., recommended Timeplex, Inc. multiplexers, Browne says that in 1986, at the time these decisions were being made, the Timeplex devices seemed as though they were being used more as data multiplexers than for voice.

Browne is pleased with the ability to configure the Stratacom IPX Fastpacket network nodes into a ring architecture, a design that saves T1 lease costs and gives each node an alternate route in case a line goes down.

Since the IPX Fastpacket from Stratacom offers a 4-to-1 compression scheme, that meant First Interstate could obtain up to 96 voice channels per T1 trunk. This, in turn, spares the bank from leasing more lines than necessary. And in case a T1 line fails, the multiplexer can give critical data priority in determining which packets get sent over the remaining lines.

At First Interstate, the company must transmit IBM Systems Network Architecture, Synchronous Data Link Control, bisynchronous and asynchronous data across the same line. While other vendors' multiplexers tend to support only a few formats, Browne says that with the Fastpacket technology, it does not matter what protocols are used to send data or voice across the wire. "The fact that the nodes are protocol-transparent saves me a lot of headaches," he points out.

In the next three years, the bank is expected to save \$1.8 million in transmission costs thanks to Fastpacket, he adds. Even so, there were risks in selecting Stratacom, since it is an independent and relatively small company. Before First Interstate decided to select that company, it performed a thorough check on its financial viability and spoke to existing users, including Intel Corp., Chevron Corp. and Hewlett-Packard Co., all of which reported success with the product.

# Before you buy

To avoid calamity when buying T1 multiplexers, consultants and network managers interviewed by *Computerworld* offer the following tips:

- Examine network traffic patterns. Do not simply count the circuits. Determine the distance of the lines to see how much you are spending and how much you can save using T1 lines.
- Determine what hardware, software and network protocols the T1 multiplexer must support. T1 devices come in both protocol-dependent and -independent varieties.
- Find out how much voice and data traffic will be on the network, both now and in the future. Be realistic; you do not want to spend more on a super-deluxe model when a medium-size one will fill the bill.
- Find out about ancillary products such as higher or lower end multiplexers. As your corporation grows, your needs for expanding T1 lines may follow. Your multiplexer vendor should be ready to offer suitable tools for large and small locations.
- As networks spread across the country, network management products are becoming increasingly important. And since most vendors are leaping onto the network management bandwagon, make sure to scrutinize the features offered by each supplier. Some users have resorted to writing their own network management software.
- Talk to other users, particularly those in the same field or companies that have similar networking requirements.

KATHY CHIN LEONG

BIT BLAST

# Third-party support rampant for DEC, Novell

**Alisa Systems, Inc.** in Pasadena, Calif., a supplier of products linking Apple Computer, Inc. and Digital Equipment Corp. networks, has entered into a cooperative development relationship with **Microsoft Corp.** The deal reportedly will produce a DEC VAX/VMS-based server and gateway family for Microsoft Mail — which is electronic mail for the Apple Macintosh.

**Able Computer Communications** in Santa Clara, Calif., recently inked a joint OEM pact with **Case Communications, Inc.** that will add wide-area connectivity to Able Computer's Easyway Ethernet product line and enable Case networks to access networks made up of DEC computers. Able Computer will resell Case's DCX communications processors and Case will domestically resell Able Computer's network cards for the DEC VAX and Microvax. Joint development projects are also said to be currently in the works.

**Communications Machinery Corp.** (CMC) announced the availability of VMS TCP/IP Release 3.0 for VAX and Microvax computers. Used with CMC's ENP-40 Unibus and ENP-50 Qbus Ethernet processors, the new software reportedly allows DEC users to interoperate with a variety of desktop devices that support Transmission Control Protocol/Internet Protocol (TCP/IP). It includes network statistical monitoring, a standard user interface, a University of California at Berkeley Unix 4.2 Socket Library and an enhanced version of CMC's Simple Mail Transfer Protocol that supports VAX/VMS mail.

More TCP/IP support for DEC users is available from the **Wollongong Group, Inc.**, which has enhanced its WIN/TCP for VMS. The product is said to allow VMS users to create gateways to other TCP/IP environments consisting of multiple Ethernet, fiber-optic or Hyperchannel media.

Also provided is the ability to monitor data transmission media and adjust the information flow to maximize throughput, mail features, enhanced file transfer protocol for all VMS file types and multiple shared-device drivers said to support up to eight standard DEC Ethernet interfaces. Pricing starts at \$2,000 on a Microvax and \$8,000 on a VAX.

St. Louis, Mo.-based **McDonnell Douglas Manufacturing & Engineering Co.** said it will resell **Network Research Corp.**'s Fusion network software for VAX/VMS systems to customers seeking to integrate DEC and Unix platforms using TCP/IP. In addition, Network Research said it has signed an OEM contract enabling it to bundle Fusion 3.2 with **Western Digital Corp.**'s Ethercard Plus. That package will be resold as Fusion&.

**Novell, Inc.**'s Netware environment has picked up more support in the last month. **Relational Data Systems, Inc.** in Corte Madera, Calif., said Revision 3.31 expands its PC/VS software support to Netware.

In addition, **Mitsubishi Electronics America, Inc.** in Torrance, Calif., said

its MP286 and MP386 computers have been certified compatible with Novell hardware and software.

Novell's diskless PCterminal is currently available through **Tech Data** in Clearwater, Fla., which has purchased Novell's entire domestic inventory of the product. Novell claimed to have sold 35,000 PCterminals.

In addition, Novell said it will be bundling **Norton-Lambert Corp.**'s Close-Up remote connectivity software with Netware Care, which is Novell's network management software utility.

Those who use **Allen-Bradley Co.**'s Vista LAN/PC local-area network are now able to purchase a network interface driver for **3Com Corp.**'s 3+ network operating system. In addition, Allen-Bradley announced it has licensed Novell's System Fault Tolerant Netware Version 2.11 for use with the Vista LAN/PC.

**Cognos, Inc.** in Ottawa and **Db/Access, Inc.** in Cupertino, Calif., unveiled a joint development and cooperative marketing agreement said to give Cognos's Powerhouse users access to data stored

on IBM hosts.

Access will be available to IBM MVS and VM hosts from Cognos platforms, including VAX/VMS, Hewlett-Packard Co. 3000 and HP-UX and Microsoft's OS/2 and MS-DOS. A version running on Data General Corp.'s AOS/VS is under negotiation. Cognos said the two companies will develop Load/Powerhouse, an interface to the Powerhouse application development language from Db/Access's Access/Star.

**Octel Communications Corp.** in Milpitas, Calif., said it has integrated its Aspen line of voice processing systems and the **IBM/Rolm 9751 PBX**. Octel's line ranges from a four-port, 75-user system to a 72-port, 7,500 user system.

Can your  
async network  
pass this simple  
test?

# Keefe

FROM PAGE 43

software while running SQL, for example, on the front end. As for OS/2, client support will be out early next year, but Banyan has not yet decided to support either Microsoft's LAN Manager or Named Pipes, Mahoney says.

**Goin' gangbusters.** Dataquest, a market research firm based in San Jose, Calif., recently looked at the U.S. revenues of 35 suppliers of LANs. Of the 35, only two vendors showed a decline in revenue — Sytek and Corvus. The other 33 LAN vendors showed revenue increases averaging 78.5% between 1986 and 1987.

**So we changed our minds.** The timing of Corvus's recent decision to file for bankruptcy protection under Chapter 11 took at least one network analyst by surprise. He rang up the LAN supplier about a month ago in response to rumors that the company would be going Chapter 11. "They said there was no way they were going Chapter 11, that they had a strong balance sheet and a strong cash position," he says, adding, "I don't like being lied to."

Corvus President Joseph Rooney says he doesn't know who the analyst talked to but noted that Corvus's cash position "has never been that strong." After the most recent efforts to secure additional funding failed, the decision was made to file for Chapter 11, he says. As-

suming Corvus pulls out of its financial woes, users might like to know that the company is planning an IEEE 802.2 version of Omnet and will also make the network "more compatible" with IBM's Token-Ring and Ethernet, Rooney says. Corvus is also a licensee of the LAN Manager.

**RISC-y business.** Data General signed an OEM deal with Motorola back in April, promising to deliver a product within 12 months. The product in question is a Unix- and RISC-based client server, according to market researcher International Data Corp. Unlike a traditional network server, this box would serve applications and users.

Banyan is the hot candidate to pro-

vide Unix on the server, but head-honcho Mahoney says, "There is nothing signed or agreed to." While the specter of the OSF AIX-based Unix alternative may throw a kink into these plans, DG's official stance is to remain committed to supporting and running "standard" Unix.

**Still waters run deep.** Quiet though it may be, Proteon is busily working on a number of projects these days, according to Proteon investor John Bayless of Sevin Rosen Management Co. Count on the token-ring manufacturer to have a ready answer to IBM's 16M-bit Token-Ring hub, with both products expected to be released around November.

Also possible is a Micro Channel version of Fronet-4. And you can expect to see a big increase in Proteon's OEM business as more and more system vendors seek token-ring technology to counter IBM's networking punch, the investor adds. Watch for some announcements in the next two months.

Proteon's interest in 100M-bit Fiber Distributed Data Interface-based networking is well known, but one amusing rumor currently making the rounds has Proteon pulling back from low-speed networks and working on a 500M-bit network.

The investor confirms, however, that Proteon is taking a hard look at Integrated Services Digital Network to see what value-added opportunities that technology would provide.

Keefe is a *Computerworld* senior editor, networking.

## Simple Test

1. Does your network provide for both *wide area* and *local* users?

Yes\_\_ No\_\_

2. Does your network support point-to-point, multi-point and *Ethernet*\* configurations?

Yes\_\_ No\_\_

3. Is your network able to talk *synchronous* when necessary?

Yes\_\_ No\_\_

4. Can you *easily* add users, nodes and new applications?

Yes\_\_ No\_\_

5. Can your network *recover* from a disaster on its own?

Yes\_\_ No\_\_

6. Does your *network management* maximize performance and control?

Yes\_\_ No\_\_

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## System ties

FROM PAGE 43

service. Teleos plans for ASK300 to support a standard software library that is currently being developed by the National Bureau of Standards' ISDN Implementors Workshop, Teleos product manager Howard Fiderer said.

The library will define standard calls for software developers to ensure that ISDN applications can run across different vendors' implementations of the networking standard, Fiderer added.

The ASK200 system can emulate a carrier's ISDN central office switch, allowing users to develop and test Basic Rate applications even if a local ISDN service is not available, Teleos said.

The ASK200 can support up to 72 Basic Rate or 18 Primary Rate Interfaces or a mix of the two. ASK300 supports up to 68 Basic Rate or 17 Primary Rate Interfaces or a mix.

Price of the IAP6000 starts at \$12,500, the ASK200 at \$37,000 and the ASK300 at \$56,000. All are available immediately.

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NEW PRODUCTS

Local-area network hardware

A CCITT X.25 packet-level board for IBM Personal Computer buses and Personal System/2 Micro Channel PCs and compatibles has been announced by Icot Corp.'s Network Systems Division.

The product is said to be targeted at the vendor's multinational customers who are currently developing private or hybrid X.25-based switched networks.

Called the PCpath X.25 Packet, the board will reportedly support access speeds of up to 19.2K bit/sec. and offer

software support for the IBM X.25 Application Program Interface and Icot's version of that interface.

The PCpath X.25 Packet will cost \$595. Software will be priced separately. Icot Network Systems, P.O. Box 91395, Mobile, Ala. 36691. 205-633-3270.

Local-area network software

Future Domain Corp. has announced the availability of small computer systems interface support for Novell, Inc.'s Advanced Netware 286 Version 2.1. The

Novell 286 2.1 Driver will reportedly allow users to interface up to six disk drives on multiple channels with simultaneous and concurrent I/Os.

The driver is available as an upgrade or to new users as part of Future Domain's host adapter kits. Complete kits include host adapter, cable, software and manuals and cost from \$289.

A Novell Advanced Netware 286 driver upgrade for current users has a price of \$75.

Future Domain, 1582 Parkway Loop, Tustin, Calif. 92680. 714-259-0400.

Links

An IBM 3270 terminal emulation and file transfer package for IBM Personal Com-

puters and Personal System/2s has been announced by Quadram Corp.

MLE is designed to support Quadram's Mainlink II line of micro-to-mainframe boards and reportedly permits a PC to emulate an IBM 3278 monochrome or 3279 color display terminal. The emulator can be memory-resident, and access to DOS may be obtained via hot key sessions. The product is said to be fully compatible with IBM send-and-receive host software packages. Both menu and command line options are available.

MLE costs \$150.

Quadram, One Quad Way, Norcross, Ga. 30093. 404-923-6666.

Modems/Multiplexers

Microcom, Inc., a software-based workstation connectivity firm, has unveiled its QX series of protocol modems, which reportedly achieve throughput rates ranging from 12K to 30K bit/sec.

The QX/12K is a Microcom Networking Protocol (MNP)-based CCITT V.22bis-compatible modem that is said to be capable of a 12K bit/sec. throughput rate over standard dial-up lines.

The QX/30K is an MNP-based V.29 FT-compatible modem with a throughput of 30K bit/sec., and the QX/V.32C is a dial-up V.32-compatible unit that can deliver a 38K bit/sec. maximum throughput over standard telephone lines.

All QX series modems are available in stand-alone or rack-mount versions and are compatible with the vendor's existing AX rack.

The QX series costs from \$799 to \$1,799.

Microcom, 1400 Providence Highway, Norwood, Mass. 02062. 617-762-9310.

Diagnostic equipment

Two fiber-optic laser sources to be used for testing single-mode fiber-optic cables have been announced by Fotec, Inc.

The S380 and S390, designed for 1,300 and 1,550nm wavelength outputs respectively, are especially suited for testing in-feeder and subscriber loop environments, according to the vendor. They are available individually or as part of a Fotec T330 Central Office and Local Loop Test Kit.

The S380 costs \$2,250, and the S390 costs \$3,250.

Fotec, The Schrafft Center, 529 Main St., Box 246, Boston, Mass. 02129. 617-241-7810.

OS/2 networking products

An IBM Personal System/2 Micro Channel-compatible facsimile board has been introduced by Quadram Corp. The board is based on a 4.8K bit/sec. chip and can reportedly convert an IBM PS/2 Model 50, 60 or 80 into a Group III-compatible machine.

JT Fax PS/Q comes with menu-driven software and operates on a terminate-and-stay resident basis. The product functions with Hewlett-Packard Co. Scanjet and Chinon America, Inc. N205 scanners and supports Brother International Corp. and Epson America, Inc. printers with graphics capabilities.

JT Fax PS/Q will be available in the third quarter and cost less than \$600.

Quadram, One Quad Way, Norcross, Ga. 30093. 404-923-6666.

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MKS Toolkit, which provides:  
UNIX-like tools for DOS systems

\*UNIX is a registered trademark of AT&T.



# SYSTEMS & PERIPHERALS

## HARD TALK

Stanley Gibson

### Total System, total control



By giving the so-called Total System Package a place of honor at its recent rollout of the AS/400

processors, IBM played to its strong suit: taking care of all possible customer needs. The Total System Packages include a processor, with an operating system already loaded, together with standard memory and disk configurations. The Total System Lease option includes maintenance as well.

During the last few years, IBM has cut prices on maintenance and tied it more closely to the products themselves. The AS/400s come with a modem to be used for remote diagnostics. IBM's 3090 mainframes also operate with such a hookup for maintenance.

Clearly, IBM wants to sell a totality, not a list of items, each of which is a commodity that can be easily compared with competing items. It wants to wrap its total offering in a pitch and follow-up that will beat everyone else — something that it has traditionally been able to do.

This trend flies in the face of the notion that users have become more and more intelligent and discriminating in recent years and are way beyond one-stop shopping with hand-holding thrown in.

But are they?

#### Customer profile

Maybe the best answer is that some are and some aren't. Many mainframe customers have the time and expertise to pick over a vendor proposal in detail. Many smaller users, particularly small businesses, do not.

While the packaging offered by IBM may be seen by cynics as a way to establish account control, if a user wants and needs a vendor to make such packages, how can one suggest that IBM is not acting in the customers' interest by selling them?

However, the Total System Package also runs conceptually counter to the open systems movement and to the much ballyhooed "Age of Unix," to

*Continued on page 52*

## SIAC takes stock of its systems

*Nerve center revamped to avoid Black Monday pitfalls on stock exchanges*

BY ALAN ALPER  
CW STAFF

NEW YORK — Black Monday might have been a dark moment last year for Wall Street, but it caused the bright light of public curiosity to shine on the computer systems that run the stock market.

The Securities Industry Automation Corp. (SIAC), the nerve center of the nation's stock trading, handles computer operations for its joint owners, the New York Stock Exchange (NYSE) and the American Stock Exchange.

After its systems were taxed beyond their limits Oct. 19, SIAC made sweeping upgrades to its computing architecture, correcting systems shortcom-

ings that slowed processing to a crawl during Black Monday's record volume of 608 million shares traded on the NYSE.

"If a 600 million-share day occurred now, it could be handled with style and grace," said SIAC President Charles McQuade.

The upgrades, according to Ellen Kroll, vice-president of development for switching and order processing at SIAC, included the following:

- Swapping Tandem Computers, Inc. TXP processors for faster VLX boxes with increased disk storage for its Limit System, the system that handles limited price orders.
- Modifying to a program within the Limit System that handles cancel processing, a process that



SIAC's McQuade

got bogged down during Black Monday. This modification increases the number of copies of the core table that tracks cancellations in the program.

- Making a number of copies of its Limit System changeable

overnight so revisions no longer have to be entirely rewritten.

• Changing the control program on its Designated Order Turnaround (DOT) system that automatically executes high-volume program trades. This modification will allow large queues to be built in semiconductor memory rather than in disk, speeding system throughput.

• Revising DOT's control program, allowing it to communicate with other applications in block mode. Previously, messages were sent one at a time.

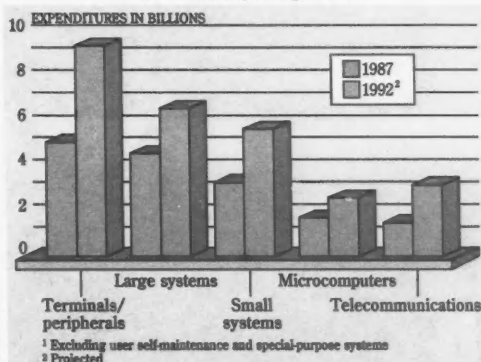
• Upgrading the memory and disk capacity of Common Message Switch, a Tandem-supplied device that interfaces with all NYSE member firms, and also upgrading its Tandem switch on the NYSE trading floor.

SIAC also increased the number of electronic books on the NYSE trading floor from 170, covering 450 listed securities, to 400, covering 1,450 securities.

*Continued on page 52*

## Data View

Customer service spending forecast  
User expenditures are expected to increase at an average of 11% annually through 1992<sup>1</sup>



INFORMATION PROVIDED BY INPUT  
CW CHART

## Fujitsu upgrades Pick lineup

BY J. A. SAVAGE  
CW STAFF

SAN JOSE, Calif. — Expanding its offerings in the Pick Systems operating systems market, Fujitsu Microsystems of America, Inc. recently introduced three systems.

One system for 10 users, one for 64 and another for 96 were sandwiched into Fujitsu's Pick lineup. Fujitsu uses its own version of the Pick operating system, which it says it has enhanced in the areas of network-

ing, terminal support and graphics.

The systems, which are slated to be available next month, are based on different processors. The System 2500/Model 80 uses Motorola, Inc.'s 68030 processor running at 20 MHz. It supports up to 96 users and costs \$89,500 for that configuration.

The System 2400/Model 60 XP is based on the Motorola 68020 processor and is clocked at 20 MHz. It costs \$35,000 and supports 64 users.

*Continued on page 53*

#### Inside

- Lasergraphics designs film recorder for mini, mainframe users. Page 54.
- Memorex Telex expands 3270-type line with display stations. Page 54.

#### HARDWARE NOTES

## Arix ties Unix line to quote system

Arix Corp. announced that Standard & Poor's Corp.'s Trading Systems will resell the Unix-based Arix 800 series, designed for 30 or more users, with Standard & Poor's Stockmate real-time quotation system.

Arix also signed an OEM agreement with UK-based Mannesmann Information Systems Ltd. worth \$12 million during the next three years. Mannesmann will sell the 800 series under its Series 9400 label. Mannesmann offers a legal package as well as packages for printing, factory automation,

construction, banking and finance. The firms are in the process of porting Mannesmann's applications to the Arix hardware.

Convex Computer Corp. in Richardson, Texas, has agreed to sell Chromatics, Inc. color graphics displays.

The Chromatics CX2000 Color Graphics Display System is capable of one million two-dimensional vector/sec. The display comes in two versions: the Le Mans, which costs \$24,440, and the Baja ruggedized version,

priced at \$33,351. Chromatics is located in Tucker, Ga.

Filenet Corp. in Costa Mesa, Calif., said it signed a five-year, \$4.1 million agreement with the state of California for an image and data processing system.

The system is supposed to automate the handling of 5.5 million pages of Uniform Commercial Code documents.

The optical disk-based system is supposed to speed response to document requests by nine times. The result is intended to be faster loan processing at

lending institutions in California.

Control Data Corp. recently installed a Cyber 955 computer system at Volkswagen AG's research and development facility in Wolfsburg, West Germany, as part of a major upgrade of computer facilities there.

Separately, CDC and Bechtel Power announced they will jointly market plant engineering products and services to the electric power industry. Bechtel engineering software will be available on CDC Cyber mainframes under the NOS/VE operating system. The first programs to be offered are for pipe support engineering and pipe stress analysis.

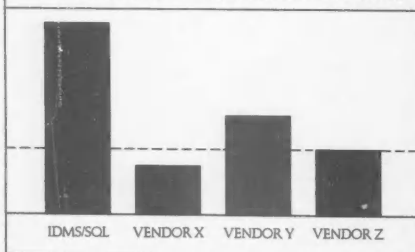
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## PERFORMANCE/THROUGHPUT

	IDMS/SQL	ORACLE	INGRES	Rdb
Compiled Queries	■	■	■	■
Hashing	■	■	■	■
Bulk Data Access	■	■	■	■
Save Points	■	■	■	■
Priority-based Deadlock Res.	■	■	■	■



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## VAX 8550

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## Gibson

FROM PAGE 49

which IBM has also declared itself committed.

Unix has been called "the user's revenge," in that it tends to reduce hardware, operating systems and application software to commodities. If this is where the computer industry is inevitably going, then IBM and other vendors have said they will go there.

### Full-course meal

However, in introducing the proprietary OS/400 operating system and Total System Packages, IBM is about as far away from the open Unix extreme as it is possible to get. Its success in providing soup-to-nuts will say a lot about what users really want.

IBM is clearly hedging on its market position in its support of Unix, as are most vendors that sell systems using proprietary operating environments in addition to Unix-based systems. IBM and these others, DEC included, have adopted both openness and secrecy at once.

IBM made its name by selling business machines — devices that added numbers and automated tasks that were once carried out by hand. The company got into computers because those machines could perform the automated tasks better than previous electromechanical devices.

IBM's Total System Packages show that it is going back to its roots. It wants to be a supplier of machines and services to increase productivity, not a computer company per se.

After partitioning itself along the lines of different computer architectures and risking becoming "just another computer company" — or worse, companies — IBM is currently reshaping itself to make computers a means to an end, not an end in themselves.

### Value-added edge

And IBM could carry over the total systems approach to the Unix market as well. This would give IBM a key value-added edge over Unix systems vendors.

Indeed, a key question for Unix vendors, after they have reduced themselves to a common denominator of an operating system, will be how to offer something more than raw commodities. Already, those vendors are scrambling to come up with the special plus they will be able to offer that the other Unix vendors won't.

Those vendors may find themselves competing against a well-positioned IBM in a very traditional role.

Gibson is *Computerworld's* senior editor, systems & peripherals.

## SIAC

FROM PAGE 49

This allows specialists on the trading floor to electronically enter trades and receive confirmation via a display terminal. SIAC expects to have all major stocks on electronic books in the near future, which will cut down on card printing.

In the meantime, the firm added more card printers and readers on the trading floor to handle manually instituted trades as the transition to electronic books continues. These electromechanical devices were unable to keep pace with the volume during Black Monday's trading onslaught and caused much of the processing slowdown, McQuade said.

On April 30, SIAC tested those systems that experienced difficulty on Black Monday. Live data from Oct. 19, compressed into a five-hour time frame, was replayed to simulate trading activity. This truncated approach forced SIAC's systems to handle order and peak message rates that were about 45% and 53% greater, respectively, than those experienced on Black Monday.

To be sure, SIAC plans another test. Since no day resembles another — even if volume is equal — SIAC said it will conduct a test in the fall to evaluate how its systems handle the stress of a different type of 600 million-share day. This is being done because typical trading activity comes in peaks and valleys and affects SIAC's systems differently; Black Monday was

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# SFT NetWare v2.1

## MIS-conceptions about

Traditionally, the MIS world has viewed PC-based local area networks with a healthy dose of skepticism. A "prove it to me" attitude. And in an arena ruled by powerful mainframes, that approach has given rise to a few misconceptions and doubts about LAN performance.

Well, doubt no more. Because with the industry standard SFT NetWare v2.1, Novell offers the LAN software powerful enough to convince even the toughest MIS skeptic.

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No other LAN software even approaches the level of fault protection and data security built into SFT NetWare v2.1. Novell has pioneered LAN fault tolerance, and provides protection from failures in server hardware. In addition, enhanced security locks and passwords give you complete control of the information stored on your LAN.

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characterized by heavy volume, McQuade explained.

#### All systems go

"I don't think that test will prove anything different," he said. "We will test the common message switch, and that didn't really flinch on Oct. 19."

Although a modicum of stability has returned to the world's stock markets, McQuade said

the company wants to ensure it can process volume that is roughly 50% greater than recent peak levels. It does not want to get caught by surprise as it was last October, he said, when studies showed that peak daily volumes would not exceed 450 million until the end of 1987 at the earliest.

"We had only one 300 million-share day until Oct. 16, [the

Friday preceding Black Monday], when 336 million shares were traded and the market was down 95 points," McQuade recalled.

The company aims to boost its capacity to handle a one billion-share day during the next 18 months, McQuade said. "We will add new Tandem boxes that offer more processing and do a major rewrite of DOT and Limit to

combine them into one environment," he said.

This will occur as SIAC prepares for a new Brooklyn data center that will be situated across the East River from its lower Manhattan headquarters [CW, Sept. 1987]. Both data centers will operate as primary sites, McQuade said, which itself should increase systems throughput and reliability.

## Centaur II grows up

NEWPORT BEACH, Calif. — Data Voice Solutions Corp. recently enhanced Centaur II Mini, its multiuser, multiprocessor business system, to support up to 28 simultaneous users.

The system allows ASCII terminals to run Microsoft Corp. MS-DOS-based applications under Novell, Inc.'s Advanced Netware Version 2.11. The previous Centaur II Mini supported Novell's Advanced Netware Version 2.0A and could handle as many as 14 concurrent users.

The Centaur II can be used as a stand-alone departmental computer or can be used with existing minicomputers and mainframes, according to Charles Spencer, the company's product manager.

The updated version offers 628M bytes of disk storage and an optional 32-bit Intel Corp. 80386 file processor. The previous Centaur II model came with 133M bytes of disk storage and was offered with an optional Intel 80286-based file processor.

The Centaur II Mini is housed in a 19-in. chassis. The system costs \$25,000 for a typical five-processor configuration that supports more than 20 users.

Previously purchased Centaur II Mini systems are field upgradable, the vendor said.

## Fujitsu

FROM PAGE 49

The 10-user System 2100/Model 50 is based on an Intel Corp. 80386 processor clocked at 16 MHz. It replaces two earlier models, the System 2000 and the System 2020, as the company's entry-level system; those older systems cannot be upgraded. The System 2100/Model 50 for 10 users is priced at \$12,000.

Fujitsu's Pick systems support the company's Common Network Architecture. According to the company, the architecture allows connection of 64 computers in a local-area network, and it can link IBM Personal Computers to the Pick network.

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## NEW PRODUCTS

## Graphics systems

**Lasergraphics, Inc.** has introduced the **Lasergraphics Film Recorder (LFR)**, which was designed to provide minicomputer and mainframe users with high-resolution boardroom-quality output.

ity output.

The recorder is capable of generating a 4,000-line slide for corporate presentations without image or color degradation, the vendor said. The unit supports virtually all graphics software packages that output Hewlett-Packard Co.'s HP Graphics Lan-

guage. The LFR is connected to the computer through the Lasergraphics Rascol III stand-alone rasterizer, an independent microcomputer. An IBM Personal Computer or compatible version is also available.

The LFR with the Lasergraphics Rascol III costs \$12,950.

Lasergraphics, 17671 Cowan Ave., Irvine, Calif. 92714. 714-660-9497.

## Data storage

A 500M-byte Winchester disk subsystem designed for large, multiuser environments has been announced by **Data General Corp.**

The vendor claimed that the product features up to a 250% performance increase over existing subsystems running on the

high-end and mid-range DG MV family of computers.

The **Model 6581-A** disk drive includes 500M bytes of formatted, error checking and correcting data protection storage with a 16-msec average seek time and a 6.5-msec average rotational latency.

A burst multiplexer channel controller, the **Model 6580**, is also being offered by DG. The unit can reportedly support up to eight 500M-byte Winchester disk drives. The packaging was designed to allow up to 1G byte to be stored in 7 in. of vertical rack space.

The **Model 6581-A** subsystem costs \$22,000. The **Model 6580** costs \$7,000.

DG, 4400 Computer Drive, Westboro, Mass. 01580. 617-366-8911.

## Terminals

**Memorex Telex, Inc.** has expanded its IBM 3270-type product line with the addition of several display stations.

The **1191A** and **1191B** are reportedly basic-function 12-in. monochrome displays with a choice of either amber or green 1,920-character screens. The units offer 88-, 102-, 104- and 122-key keyboard support and are listed at \$1,235 with a three-month warranty.

The company is also offering the **1191D** and **1191E** 14-in. monochrome display units. Keyboards are available in 88- or 122-key configurations, and the units cost \$1,395 with a one-year warranty and \$1,425 with a three-year warranty.

Two color display units, the **1091C** and the **1092C**, were also added to the product line. The **1091C** has a 12-in. monitor and is said to support seven colors. It costs \$1,745 or \$1,895. The **1092C** has a 14-in. monitor with a 1,920-, 2,560- and 3,440-character screen and is available for \$1,845 or \$1,995. Pricing depends on warranty options.

Memorex Telex, 6422 E. 41st St., Tulsa, Okla. 74135. 800-331-2623.

A multitasking graphics terminal has been announced by **Mod-graph, Inc.**

According to the vendor, the **GX-2000** is a 15-in. high-resolution graphics terminal that can perform a variety of functions simultaneously. The unit offers a resolution of 1,024 by 780 pixels and can emulate the Tektronix, Inc. 4010 and 4014 graphics terminals as well as the Digital Equipment Corp. VT220 model. The four available graphics pages of the GX-2000 can either be written to from the host or printed, transmitted or examined in parallel. The display is available in amber and green.

The GX-2000 costs \$1,295. Modgraph, 149 Middlesex Tnpk., Burlington, Mass. 01803. 800-327-9962.

## How to Buy Time for Your IBM 308X.

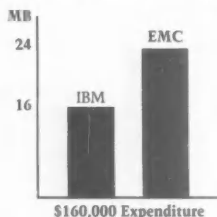


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## 2. Maximize Your Savings.

EMC uses state-of-the-art technology and production methods to offer our 308X upgrade at 30% lower cost than IBM. A 16MB upgrade from IBM is priced at \$160,000. For that same price you could buy 24MB of EMC main storage. That's an additional 8MB of main storage or a savings of \$50,000. Either way you save with EMC. EMC also features coterminous leases and trade-up credits so the return on your investment continues after your purchase.



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# IN DEPTH

## All your assets on-line

*An 'information factory' provides end users with the ultimate in data access and purity*

BY KEN SLOAN

**W**hen Rob Harmon was chosen to head the Marketing Information Systems department of the then newly formed Bell Atlantic Corp., he had a real challenge on his hands. His assignment: rapidly implement a regional marketing information system from three separately developed and operated systems — Bell of Pennsylvania, New Jersey Bell and the Chesapeake and Potomac Telephone Companies.

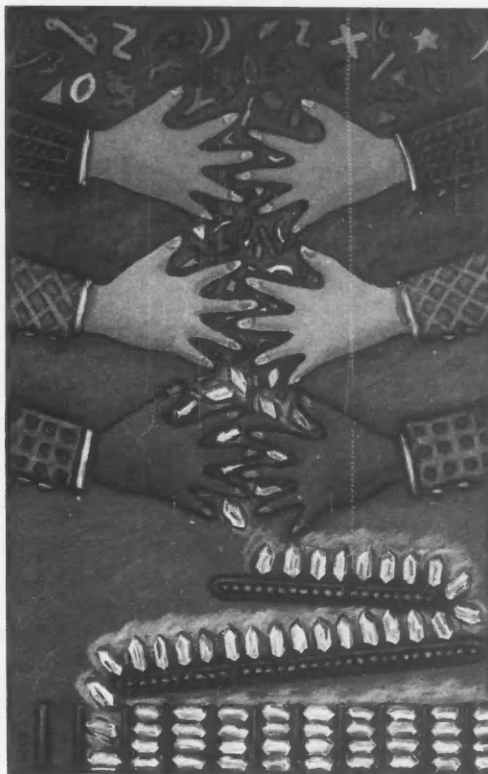
This task was not an easy one. After divestiture, the new company, Bell Atlantic, was formed from six smaller divested Bell operating companies. Information critical for planning and week-to-week management had to be made available to the managers now responsible for all six companies' combined operations.

The previously existing information systems had been adequate within their home companies. But none of these systems could consolidate all the various data formats while retaining the intended data meanings within the new context.

Something completely new was needed. Harmon's answer: the Marketing Integrated Data Analysis System. Using that system, Harmon's department consolidated pre-existing systems' information.

Different groups collaborated on standards and implemented a cost-effective system that made critical information readily avail-

Sloan is president of Sloan Software Services, Inc. in New York, consulting in innovative software products and strategic information systems. He is the former manager of data base product research and development at Applied Data Research, Inc.



DIANE JAQUITH

able to managers. In short, they created what is called an "information factory."

### **Makes the job easier**

An information factory is an emerging technique for information resource management. Its premise is to deposit and maintain — on-line — all pertinent information with full history retention. An information factory can improve managers' access to data for decision-making at all

levels. Instead of seeing just summary data or averages for a year or a month, analysts can look at the actual data and base their decisions on more solid ground.

Although the particular term "information factory" may not come into common use, a number of leading companies — including Bell Atlantic, American Airlines, Citibank NA, Bankamerica Corp., AT&T, Liberty Mutual Insurance Co. and K

Mart Corp. — are implementing systems of this type.

Data integrity and consistency are key to any information factory. In the Bell Atlantic case, the value comes from the explicit agreement — across systems — on standard data item names, representations and meanings. Data items can be transferred and still have the same meaning, regardless of context.

When assembled, the information factory becomes the definitive management information source. Unlike other corporate data bases, which often include only production data, this particular data base gives end users access to archival data, massaged to fit uniform data formats.

Even a few years ago, such an idea would have been considered impossible. Physical storage and retrieval software were simply not up to the challenge. But today, the dramatic capacity increases and cost reductions make an information factory economically feasible.

### **Missing out**

Few organizations today believe they are fully exploiting the enormous amounts of data they have accumulated. In most enterprises, only summary or partial information ever moves outside of the production application that first captured the information.

This means that to understand or analyze the information, a user must go back to the production application data base. If the user needs historical data, it is unlikely that the production data base has retained the data.

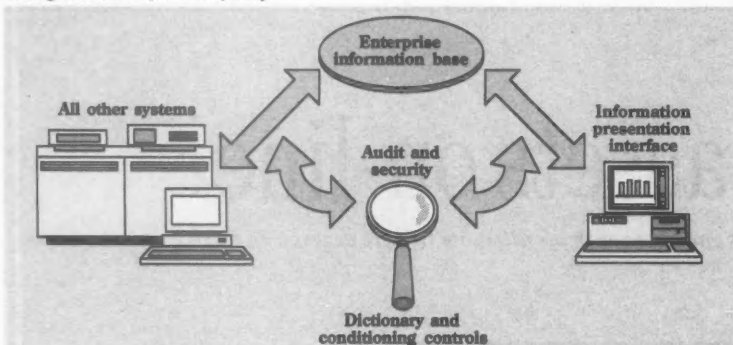
An enterprise using the information factory approach can access the detail level of the organization's functions rather than attempt to manage from just summaries or extracts. This is a

- **Manufacturing-style data management**
- **Bell, American Airlines, Citibank jump in**
- **Added value: Integrity and consistency**



## Raw materials

What goes into an information factory?



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CW CHART

very important distinction.

For example, imagine an airline's decision process when its on-time record is poor. Industry surveys show the airline lands late too often. But what is to be done? One management level cannot just shout down to the next: "Hurry up!" Someone must look at the actual detailed history and analyze the factors that led to those late departures and arrivals. Solutions must also be simulated within a historical context.

The same "management-by-the-numbers" thinking can be used in loan analysis, insurance loss forecasting, customer servicing, manufacturing quality control and government services.

Or consider this analogy. When you are trying to ford a wide, muddy river, are you interested in the average river depth, average current speed and average bottom composition? Per-

haps. But if that is all the information you have, you may have a rough crossing. What you really want to know is the shortest, safest place to cross the river.

### Compare and contrast

In addition, the data base names, formats and structures almost always differ from one application to another. This makes data synthesis or comparison across applications very difficult. End users are really limited to using data for the purpose envisioned when the data was first automated.

Users generally cannot pull data from a variety of historical sources because once a data item has been removed from its original application, interpreting it correctly is difficult.

If a data item cannot be correctly understood, it cannot be combined with other information to manufacture a new product. Instead, it is just data pollution.

Current generalized information management tools do not address this problem. Traditional data management approaches, focused on automating repetitive operational functions, seem unable to cope with present volume and complexity. And waiting in the wings is an explosion of new data and applications as increasing amounts of textual, graphical, audio and other data is automated during the 1990s.

An information factory may answer this need. Many organizations already cost justify systems simply by demonstrating the improved decision-making capabilities they provide. By making connections between data and its interpretation consistent, an information factory can add this value. It makes different systems' data like different nations' currency. A form of currency has value where it originates but must be translated outside its issuing country. The

more widely understood data is as negotiable information, the more valuable it is.

An information factory acts as a filter so MIS can accumulate information and develop a way of managing mixed systems that retain the data's content and make it consistently available and valuable to end users.

### Factory functions

The information factory has four functional components: the enterprise information base, the enterprise information directory, the data conditioning system and the information presentation system.

**The enterprise information base** contains all the company's data in a relational data base management system. It establishes information authority, superseding that of the production application system's. This is heresy in most organizations, but it is essential for establishing a single enterprise information source. As it evolves, production systems will more clearly represent "work in process," while the information factory will maintain audited results. The enterprise information base contains edited and audited data in rationalized and integrated data structures.

**The enterprise information directory** defines the data stored in the enterprise information base, including the names, edit rules and formats for data. The directory can be implemented as a commercial data dictionary or as extensions to the DBMS catalog. The enterprise information directory contains the name and structure mapping between various data sources and the enterprise information base's accepted internal format.

In addition, it controls the data conditioning process. The mappings are invoked by the data conditioning system when data is entered into the enterprise information base.

**The data conditioning system** is a collection of procedures and control statements for extracting or unloading data from sources outside the information factory. It then restructures, renames and reformats that data according to the standards stored in the enterprise information directory. The data conditioning system is implemented using a fourth-generation language or a data manipulation product. Its other functions are to validate data quality, report results back to the originating system and update the enterprise information directory.

The information factory approach does not eliminate the need for application systems to edit and audit data. However, many times production systems have been distributed across multiple locations and have been implemented in the distant past or by other parties. Therefore, it is impossible to ensure that edits and audits are performed at the first processing point. Data must be re-examined before being loaded into the enterprise information base.

**The information presentation system** is a collection of user interface products that lets authorized end users access information in the enterprise information base. The information presentation system uses mappings of aliases when end users request information in a non-standard format. There are a range of commercial products for micros, minis, workstations and mainframes that can be used

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## Pumping data

The MIS manager at a major West Coast bank needed to cut in on the 80/20 waltz to which his staff had been dancing. "Instead of spending 80% of the time using the information, we were spending that amount of time looking for the data," he says.

The solution: an information factory that performs corporate extract services. MIS now acts as the central "data pump" and extracts and loads most of the bank's production data onto a Tera-data Corp. data base computer. The manager's aim is to make the information factory "the definitive source of data from which we deliver management information to all our users." MIS selects data for the information factory and sends it through a condi-

tioning process. The data is "scrubbed" and standardized before it is stored.

The source data remains constant, even when business definitions change. As the MIS manager explains it, "The credit policy committee thinks something is delinquent at a different period of time than the operational bankcard centers. So you've got to be careful how you aggregate it, because different users have a legitimate need to look at data differently."

But there's still a long way to go before realizing a single corporate MIS data store. "Numbers-wise, I've probably got about 8% of the people in my group doing data. There's a lot of data in that other 92% still," the MIS manager acknowledges.

KEN SLOAN



to provide access interactively, on a submitted program basis or on a program-to-program basis. The product MIS chooses will dictate how the information presentation system selects data, how it presents data and how users can analyze data.

An information factory makes information quality a line responsibility. Production applications are still planned and implemented. But more and more, these systems are the responsibility of the organizational units that need them.

The fundamental information factory policy is to determine whether the information at hand is of current or future enterprise interest. If so, it is passed through the data conditioning system and into the enterprise information base. This policy parallels the normal financial accounting policy used by most firms.

Part of management's job is determining what data on what schedule will be moved into the enterprise information base. Once this has been decided, every application's processing routinely transfers data through the data conditioning system to the enterprise information base. For the sake of audit balancing, a common strategy uses a synchronization point — hourly, daily, weekly or monthly — at which new data is transferred, unless continuous updates are required.

After the information factory is in place, new production applications can focus on production processing. The applications will pass the acquired data to the enterprise information base as a normal by-product of the processing cycle.

The information factory does not replace the functions provided by existing or future production applications. Instead, it complements them.

Production systems are always  
*Continued on page 58*

## Not the same

**M**IS managers should not confuse an information factory with an information center. Although they both deliver data to end users, there are major differences.

- **Control over data movement into the system.** The information center emphasizes user-driven data extracts and loads on an as-needed basis. The information factory's contents are determined top-down.

- **Data editing and auditing.** Some editing occurs as a by-product of information center activities. Consistent editing and auditing of data is, however, a major benefit of information factories.

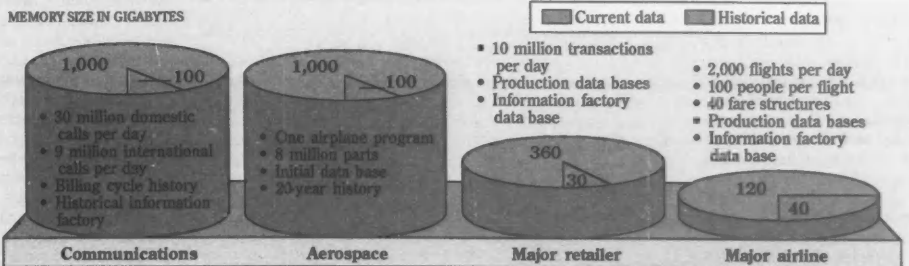
- **Data completeness.** To meet its requirements, the information factory will need complete information access. For example, when validating a customer order history, one requires a complete parts master history and perhaps a complete inventory history. There is no equivalent information center goal or capability.

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## How big would your information factory be?

Your repository consists of all on-line data, plus selected historical data

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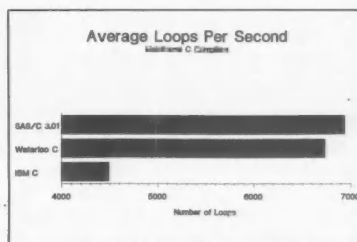
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## Assets

FROM PRECEDING PAGE

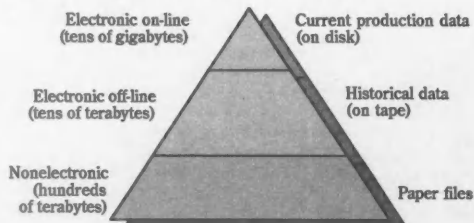
concerned with the hypothetical "now." If you update data in a data base, you lose the data value in the position you updated. In contrast, the information factory is cumulative. Time becomes a qualifier on a query. The enterprise information base is well suited to address time-series inquiries because it retains histories that production systems have traditionally neglected.

Companies that implement information factories do so because their production applications cannot support intensive analyses. In the absence of such an intense, top-down need, it is unlikely that an information factory will be successful. The political travails of crossing boundaries aside, the financial difficulties of cost justifying new computers and disk storage may be too much for the project.

Too much planning will also kill an information factory. The reason: It involves a lot of poli-

### Bottom heavy

The total amount of information that a typical Fortune 1,000 enterprise owns far exceeds its current production data



INFORMATION PROVIDED BY SLOAN SOFTWARE SERVICES, INC.  
CW CHART

tics, some up-front technical confusion and considerable reeducation about an organization's information. If an attempt is made to answer every objection before moving toward implementation, the project will be slowed to a snail's pace.

Remember that complete analysis of an organization's data normally takes years and is never truly complete. If the first information factory task is to ana-

lyze all corporate information, then be assured that success will be elusive. Instead, meet the information need that drives the first project. Make that a success, and then build on it.

Pick a project big enough to pay back the investment but small enough to be reasonably accomplished within six to nine months. In most organizations, there must be some concrete payback for this kind of new ap-

proach before the next budget cycle or funding could be lost.

Use what software is already available. Data bases, dictionaries, application generators, user interface tools and report writers are useful. Choose current staff members who already have experience with these tools for the information factory team.

### Possible disadvantages

A large project like this can severely strain the data storage and management demands of even a very large mainframe configuration. In some cases, an information factory may free up disk space that had been used by a production application or an information center, but this is not the usual case. This has led some firms to invest in front-end data base machines as their platforms.

The other option is to support an information factory through special software. IBM has done the research, design and development work for Enterprise Systems Architecture (ESA). Apparently, IBM anticipates that

future applications will include more information than current applications, especially in historical detail data. ESA will be a platform on which even enormous data amounts required could be supported in a traditional mainframe environment.

Information systems today stand on the threshold of a manufacturing-style era. This change is the equivalent of an industrial revolution: It is based on the mass production of interchangeable parts and components, each made to a specification.

For most companies, information manufacturing is still at the handcrafted level. The vast majority of data is still only intelligible within that system — like noninterchangeable, handmade gun parts that have no use beyond the particular gun for which they were fabricated. With sufficiently high payback now possible and massive storage and retrieval systems moving to within reach, we may begin to see a chicken in every pot and an information factory in every Fortune 1,000 company. •

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## Regional answer

If a product manager at New Jersey Bell needs a tracking and recording system on his product line, chances are the managers at Bell of Pennsylvania and the Chesapeake and Potomac Telephone Companies need the same thing. Why develop three separate systems when one regional system could be shared?

This solution, of course, has its own set of problems. While the goal may be a shared system, the reality is that the data that would make up the system is specific to the operating companies. Thus, Rob Harmon, Bell Atlantic Corp.'s marketing information systems director, had to reconcile a number of variables: the hardware and software technology, the applications being deployed, the product line definitions and others.

"We determined that what we needed was one regional, integrated data base to bring our customer data together. We wanted customer revenue, billing information, products and services all in one place," Harmon says.

The project team wanted to create a relational data base within which the user could get to any data element to mix and match the elements and then sort, select or display those elements in any combination.

"As we set out to identify the majority of information

that potential users would need, we wanted to do so without locking ourselves into a single method of access or limiting our ability to display that data," he says.

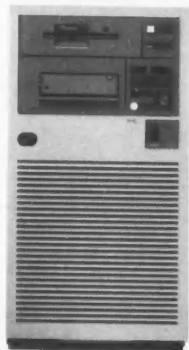
But nonstandard, fragmented, redundant systems that gobbled up much-needed systems resources existed across the region. "We would supply User A with one million records on one time-share system that would meet her specific needs — or, more likely, her department or work group's needs," Harmon says. "User B, however, can't use that particular view of the data, so he would have his own little data base on the same or possibly an entirely different time-share system — and on and on."

All of this data was placed at the end users' disposal, yet none of it was recognized as the official corporate data base. This view is changing, however, and Bell Atlantic's Marketing Integrated Data Analysis System is becoming the sole source of marketing information for the corporation.

End users can now access the more than 1,200 data elements found in the common data base, encompassing all of the typical applications and ad hoc queries as well as Must Software International's Nomad2, interface software products, canned procedures and models.

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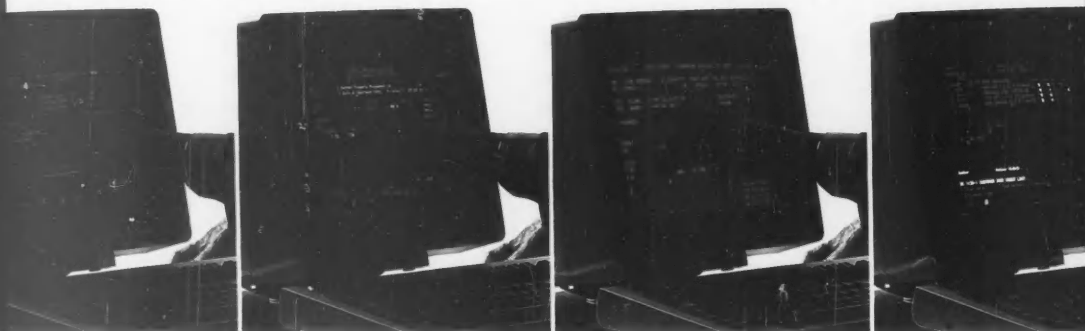
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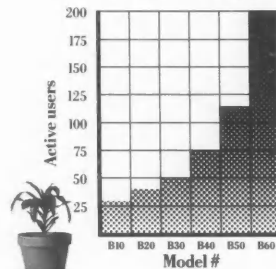
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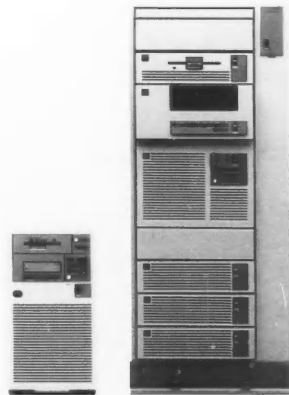
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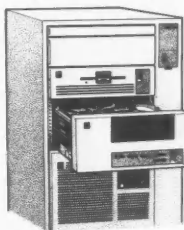
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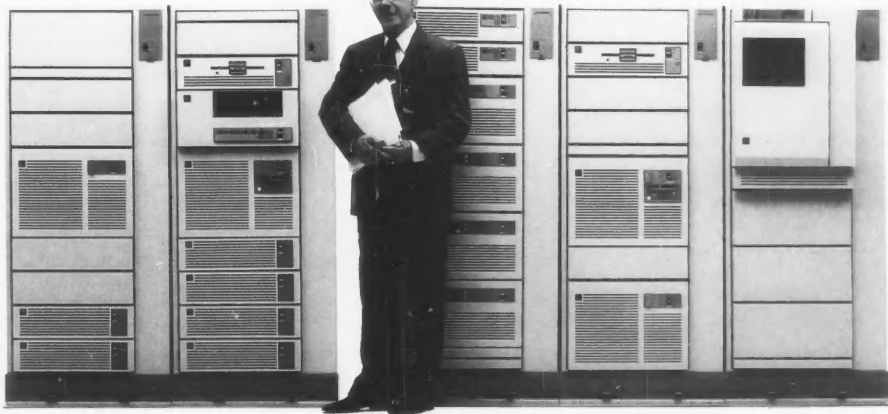
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*From left to right, the IBM Application System/400:  
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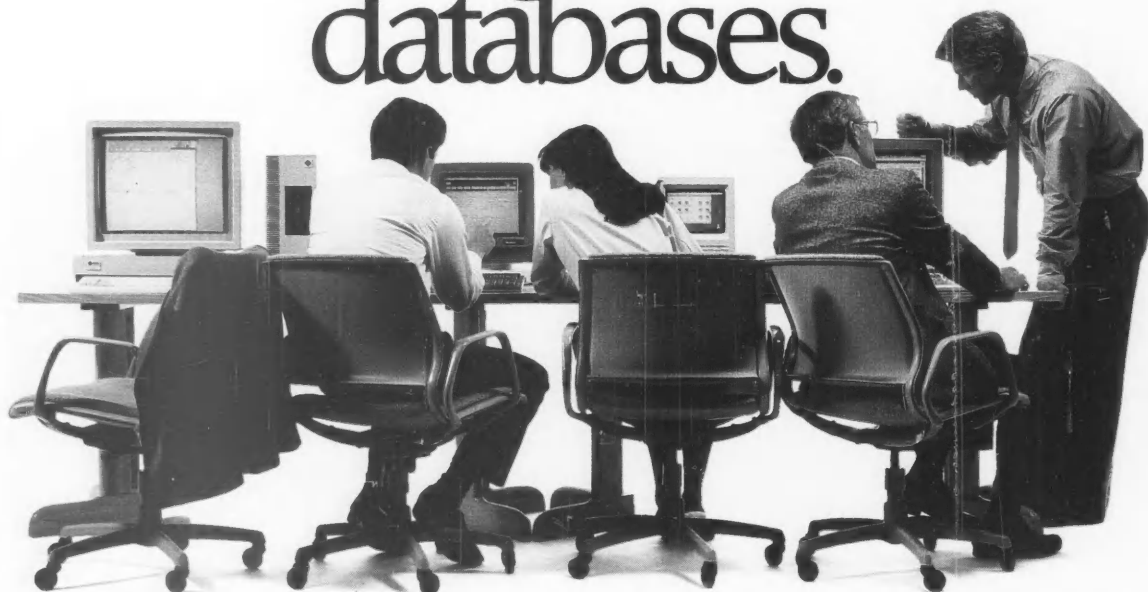
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**SENIOR EDITOR**  
Joanne Kelleher

**ASSOCIATE EDITOR**  
Deborah Ficking

**RESEARCHER**  
Bonnie MacKeil

**ASSISTANT RESEARCHER**  
Kevin Burden

**Designer/Cover:**  
P. Charles Ladouceur

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**Protecting systems is a harder job these days. Threats are multiplying, and the level of acceptable downtime is dropping**

# NO SUCH THING AS A SMALL MISHAP

BY PETER SCISCO



ALAN HOPKINS

A fire in Chicago severely damages a switching office at Illinois Bell. Businesses are left without data and voice communications, two vital links to their continued survival. Another fire, this time in a Los Angeles skyscraper, burns a number of floors and destroys the cabling that feeds several business data centers. A transformer explodes in downtown San Francisco, spraying a data center building with polychlorinated biphenals, or PCBs, and rendering it temporarily uninhabitable. The mainframe inside works fine and the data is uncorrupted — but the operators cannot get to it.

Less dramatic but also as disruptive, computer viruses infect system files and wreak havoc as they replicate throughout mainframe data bases. Traumatic hardware failures wipe out weeks of data that must be reconstructed.

From earthquake to disk crash, the disruption of computer services can fatally damage any firm that is not prepared.

As on-line systems proliferate, decentralization grows and telecommunications becomes an integral part of information processing, the definition of disaster is also evolving. What does not change is the need for sound emergency planning.

Harry Dillman, director of computer services at the University of Hartford in West Hartford, Conn., says the rise of interactive and on-line systems gives disaster planning a more important role than ever. In the days of batch processing, he says, neighbors could help you through a disaster by running your systems on their machines. But that is no longer the case.

"The definition of a disaster is the loss of capability to process information," he explains. Whatever might contribute to that loss needs to be anticipated and planned for.

George Derry, senior systems programmer at the East Bay Municipal Utility District (EBMUD) in Oakland, Calif., says his company is moving away from batch runs and toward interactive on-line systems. That means his window for recovering from a disaster keeps getting smaller and smaller.

"Our customer billing system is going virtually 100% on-line, except for meter reading," Derry says. "All of our accounting stuff is on there. Payroll is on-line. We could probably get by for a few days — but that would be it. Then they would have to run a triple or quadruple billing cycle in one shot just to get the bills out and process the payments."

Tom Comeau, senior systems manager at the Space Telescope Science Institute in Baltimore, says there are different classes of disasters, ranging from earthquakes, fires and floods to power outages, disk crashes and intruding hackers. He says he thinks the definition of disaster has grown to accommodate man-made as well as natural disruptions.

"More and more, we're concerned about disaster-proofing against people coming in and doing things to our system, either accidentally or maliciously," Comeau says.

The definition of disaster is changing not only because there are different types of disruptions but also because businesses have become heavily

Scisco is a free-lance writer based in Charlotte, N.C.

## No such thing

FROM PRECEDING PAGE

dependent on their computer operations. The term "disaster recovery planning" is giving way to "contingency planning." Businesses must plan to survive and operate, no matter what the condition of their data centers.

### Not always natural

Catherine Weyhausen, senior consultant at AT&T's Data Security Service Division, based in Orlando, Fla., says dependency on on-line processing means the availability of data is paramount to a firm's survival. But, she points out, "disaster recovery" places too much emphasis on natural disasters when, in fact, those are only the most dramatic disruptions. Such emphasis comes at the expense of the less noticed but equally damaging disruptions.

"Disaster recovery implies to most people that there has been a disaster, which is fire, flood, earthquake, that sort of thing," she says. "Contingency planning is for business continuity." Businesses provide the services, she says, and the data center's purpose is to enable firms to provide those services.

"We're not necessarily talking about the devastation of a computer center," Weyhausen says. "It could be the loss of communications lines, a loss of a processor, or — what's big now is viruses — the loss of the quality of your software so that it's no

longer dependable."

Others agree. "It's very unlikely that this building will get hit by a tornado," Comeau says. "It's also fairly unlikely that it will catch fire. But it is fairly likely that, even as we speak, there's a hacker trying to get into my system. In fact, I'd say it's almost a certainty."

"We used to think of [disaster] typically in terms of fire, floods, hurricane and tornado," says Hugh Smallwood, president of Data Base Recovery Services in Columbia, Md. "But it's starting to be things that are nonhistorical."

To further complicate matters, the movement toward decentralized data processing centers makes preparing for emergency contingencies more difficult. More sites have to be safeguarded, and more personnel have to be brought into the decision-making process.

The data center has traditionally been the hub of the computer operations wheel, with spokes emanating toward secondary sites along the rim.

The rise of departmental computing makes distinguishing hub from spoke and rim difficult: Information is increasingly transient and active and less passive and stable.

"More and more responsibility is moving out into the functional areas," says Gerald Isaacson, an independent consultant at Information Securities Services, located in Northboro, Mass. "That is a problem that

has to be addressed."

Isaacson says everybody recognizes that if the mainframe goes down, it adversely affects the company's ability to function.

That recognition leads people to think of disaster planning as a DP contingency plan, he says. They should instead be thinking of it as just one part of a business continuity plan — a plan that encompasses not just the central data center but all of the departmental systems that contribute to company activities.

Raymond Epich, vice-president at The Diebold Group, Inc. in New York, says he agrees with Isaacson. His firm asks businesses to step back and examine all aspects of their operations when they consider a disaster plan. "They have to be able to recover from a disaster of any type at all of the locations," he says. "It's not addressed by saying, 'We have a hot site for the data center.' That really doesn't do it."

The Diebold Group estimates that only about 50% of central DP sites have an adequate disaster recovery plan. Epich says that roughly 5% of distributed processing centers have made contingency plans.

Decentralization does not in itself offer complete protection in case of disaster, but departmental sites can offer alternatives when planning for it, Weyhausen says.

For instance, a business could use its remote facilities for alternate processing in cases in which the central data center is down. But to do that, a firm must first identify what its critical functions are and then retain some processing capacity at the remote site — meaning an extra expense of maintaining hardware that is not used.

"Decentralization has the potential of offering some alternatives, but you have to design that right from the beginning," Wey-

hausen says. "If you try to retrofit, you might not gain anything."

Kenneth Myers, president of K. N. Myers & Associates in Pittsburgh, says that building a structure in which mini-computers can operate for longer periods of time without the mainframe accomplishes two things. First, it enables data centers to perhaps operate during the disaster recovery period by themselves. Second, if they cannot operate, the company can replace them less expensively and more quickly than it can a mainframe unit. By conserving resources in this way, businesses can survive longer during disaster.



University of  
Hartford's Dillman

### Small savings

Several alternatives exist for diverting small disasters like disk crashes and viruses. Users can monitor their systems for potential problems, recover data lost in power outages or through human error and track hackers who are intent on infiltrating the system.

Space Telescope Science Institute's Comeau says he uses Digital Equipment Corp.'s Vaxsim to keep an eye on 12 VAX systems, which operate along with seven Microvax IIs, two Vaxstation IIs and 13 Sun Microsystems, Inc. workstations.

Vaxsim runs out of its own batch queue, he says, and monitors the error log. If the number of errors from a particular part of the system — a disk drive, for instance — suggests a trend, Vaxsim notifies users with a light. Users can then run the product interactively to determine exactly where the problem is. A call to the customer support center can verify the error-log analysis

and replace the malfunctioning equipment before the problem mushrooms.

So far, Comeau says, Vaxsim has spotted two faulty head disk assemblies and one bad micro-module. The product's Autocopy feature shadows the data on suspect drives, he says, providing an automatic backup if it fails before it can be replaced.

EBMUD's Derry says he uses the DRS Recovery System from Integrity Solutions, Inc. in Littleton, Colo., to recover data lost to malfunction or error. The public utility runs a large customer service system, including a batch billing run.

"We had a problem with our nighttime customer billing batch run," Derry says. "One of the programmers goofed and managed to clobber our customer billing master. This was a Thursday night. We had to recover four days of CICS journal entries." He says he was able to recover a full day's

entries in about 10 minutes.

Frank Abenante, section manager in the customer information system at Consolidated Edison Company of New York, Inc., says he uses a recovery and monitoring package from On-Line Software International,

Inc. He says in 20% to 25% of the cases in which he has used Stabilize, the product was able to repair damage caused by system outages and allow the system to keep functioning.

One possible drawback to system monitoring packages is that in some cases, they actually prolong downtime, Abenante says. Stabilize's surveillance region, which monitors the system, takes control when an error is detected and then moves to repair the damage.

If, for some reason, it cannot perform the repair, he says, the amount of time the product takes to complete the analysis and announce that the system has to come down might increase the outage time because the



Kenneth Myers

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delay in bringing the system down complicates the problem.

That might explain why Abenante sees the role of recovery and monitoring products differently than some of his peers. "I don't consider the product built for disaster recovery," he says.

Con Edison's disaster recovery planning focuses on the possibility of an entire system failure or on the event that a data center, for whatever reason, cannot be occupied.

**A**S A PUBLIC utility, we're always concerned with [sabotage]. There's always a possibility that sabotage can, in fact, happen."

FRANK ABENANTE  
CON EDISON

For those scenarios, the company has a multilevel contingency plan. On-Line's Stabilize serves only as a quicker way of reinstating the system and preventing an outage, Abenante says.

#### Keep on your toes

The key to preventing disaster caused by unauthorized intrusions — either from hackers or viruses — is to be prepared and aware.

It is also a good idea to maintain a sound level of security on the system and the networks it interfaces with.

Comeau says he tries to educate users to watch for encroachment. The Space Telescope Science Institute is especially vulnerable to hackers and viruses because it must remain open to public networks.

"Preventing an intrusion is almost impossible in a system like ours because it's an open system," he says. "We have to be available to the world at large."

"We thought we had one [virus] for a while," Comeau continues. "We found out about another one and barely avoided having one of our users run it."

He says that the time lost in tracing a hacker and repairing the damage can be almost as damaging as the data lost during the sabotage.

The Space Telescope Science Institute takes a number of security measures to guard against virus infiltration.

Personnel are constantly monitoring the electronic bulletin and talking with outside developer contacts at vendors such as DEC and Apple Computer, Inc. to find out what the latest bugs and viruses are. The status of the software is also constantly monitored in order to detect changes in how the software is functioning.

Finally, Comeau says, personnel carefully inspect all shareware that they copy onto their network. "We don't install anything we don't have source [code] for, and we look at the source really carefully," he explains.

"As a public utility, we're always concerned with [sabotage]," Con Edison's Abenante says. "There's always a possibil-

ity that sabotage can, in fact, happen."

Con Edison uses a variety of software security packages to safeguard its applications and maintains a watch over who enters the site by using badge readers and magnetic strip identification cards. "Those things are really targeted toward the deliberate types of [disaster] causes," Abenante says.

Whether disaster comes at the hands of a hacker or at the whim of nature, the first line of defense is a plan of action.

#### Not so easy

At central data sites with clear lines of command, the responsibility for planning usually falls to the DP department. But at remote sites, shouldering that responsibility is not always so clear

and simple.

Part of the problem is that remote sites are just that — remote. Separate from the corporate mainstream, departmental business units are cut off from the collective corporate memory that can assist in designing a sound disaster plan.

"A lot of the ideas and experience that have been learned the hard way in the central site are

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just not transmitted out to an individual business unit manager who may have a mini or a micro on his own premises," The Diebold Group's Epich says.

"He really doesn't remember when they were down or out, when they had backup and recovery problems or when the data was destroyed. They just don't know about things like that," Epich continues.

He says some companies are writing contingency plan policies and then teaching the decentralized sites what the potential problems are.

### Still a problem

Consultant Isaacson says that in some disaster scenarios, the mainframe remains functional but a departmental system fails, disrupting the whole company. The business may continue to function, he says, but it must realize the impact of that departmental loss.

If the department supplies a critical function, then a disaster plan must be implemented for it. Failure to understand the criticality of remote sites increases the risk to the bottom line, he says.

**YOU HAVE TO plan for the absolute worst case. You have to plan for absolute total destruction to affect all areas."**

HUGH SMALLWOOD  
DATA BASE RECOVERY SERVICES

"The risk is increasing not because of decentralization per se but the fact that people — particularly with microcomputers — have a hard job understanding that when you get a micro on your desk, you become a data processing center," Isaacson says.

With that understanding comes responsibility — for data backup, for planning and for becoming aware of security concerns. "People have been trained to think DP will handle all of that," he says.

If a business unit is to operate unfettered — streamlined and on-line — it cannot do this with one foot in the corporate DP center. The unit has to be able to stand alone and survive should

disaster strike.

Decentralization also brings up the subject of communications, perhaps the newest area of contingency planning to be addressed. Remote as they are, decentralized sites have access to the corporate mainframe.

In many cases, a business' success depends on that link. This is an area that was thrown into high relief by the recent fire in Chicago that roared through a main switching office at Illinois Bell.

"That's a new category of disaster that people had not thought of," Epich says. Although many firms might have dual feeds from electric utilities, phone lines are overlooked, he says. "Those companies that have redundant phone service are one in 100."

Companies also have to look at their local-area networks.

"The functionality that allows us to develop these decentralized and distributed processing environments is the network itself," Isaacson says. "When that goes, everything stops."

For disaster planning, the focus is on data communications — not by common carrier but by

cable in the building that houses the LAN, he says.

Companies should incorporate a contingency plan for the network at the time the network is designed and follow through with that plan when it is implemented.

"Not only are you looking nowadays at being able to restore the computer," AT&T's Weyhausen points out, "but you have to be certain that you have a complete inventory of all your communications lines, that you determine some alternate routing if necessary and that you provide for that in your contingency plan."

Companies need to know not just their hardware vendor, she says, but their communications vendor as well.

### Top priority

But whether it is for a small decentralized site, a larger departmental site or a main DP site, planning is the key to surviving a disaster. And when planning for

disaster, the more fertile the imagination, the more creative the plan.

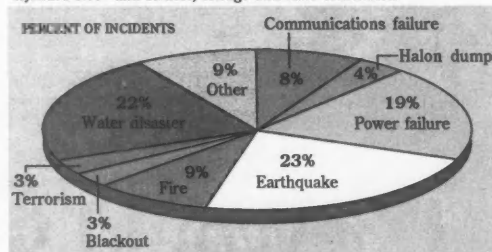
"You have to plan for the absolute worst case," Data Base Recovery's Smallwood says. "You have to plan for absolute

to a storage facility for safekeeping.

Consultants and most users see this as only one step in disaster recovery planning. Off-site storage is inexpensive, but it cannot help if the firm has no ac-

### Don't mess with Mother Nature

Earthquakes and water were the damaging factors in almost half of 91 documented disasters; other causes included humidity, software error and viruses, sewage and toxic evacuation



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total destruction to affect all areas."

"It's no harder to plan for the worst than for something trivial," The Diebold Group's Epich says. "In the old days, people used to sit around and agonize over what could happen. And they would say, 'What are the odds of a fire? Oh, it's one in a 1,000. What are the odds of an earthquake? That's one in a million.' And they'd think through all these odds and think about the probabilities of disaster."

"We encourage people not to fool with that anymore. That's not the issue," he continues. "The issue is, 'Let's assume that there is a disaster and we cannot get into that room.' How do you continue business if that is the case? That's a much more creative way of approaching it."

The first step in business continuity planning is to define how critical the computer systems are.

That means determining the impact of being down for one day vs. five days vs. 15 days, Smallwood explains, and then figuring how that impact will affect revenue, customer base and local business. It becomes a mathematical evaluation of risk vs. cost.

When conducting a criticality study, Weyhausen says, firms must identify what kind of inventory of data and communications they need to supply those functions deemed critical. They must also determine how long they can go without those functions and remain viable.

### Plan for survival

Based on the answers to its criticality analysis, a company has several alternatives for disaster recovery planning. For the survival of the data center, they include the following:

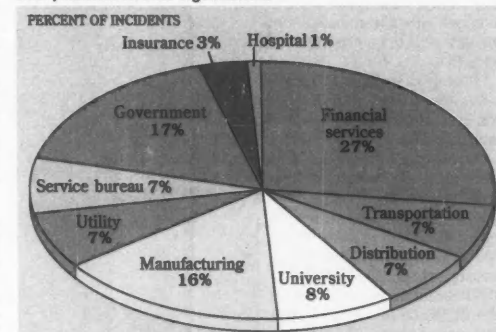
• **Off-site tape storage.** Sensitive data, including operating systems and data bases, is backed up regularly and shipped

to its mainframe.

• **Reciprocal agreements.** An agreement is made with another data center, sometimes within the same company, to process the company's information either by sharing time or space on the system. By most accounts,

### No safe harbor

The financial industry was hardest hit by data center disasters; almost one-third of 91 incidents studied took place at banks and other financial services organizations



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these agreements simply cannot work well enough to avert disaster.

• **Service bureaus.** An arrangement is made for an outside vendor to process the company's information in case of a disaster.

The drawback here is that most service bureaus are not designed for that kind of function, and they already have nondisaster-related customers to service.

• **Electronic vaulting.** A form of off-site storage that eliminates the transportation costs and time lost in shipping media by truck. Backups of the company's files are transmitted by networks to a storage facility, where they are downloaded to tape and stored.

In case of an emergency,

backup can be sent immediately, again by network, to the company's designated disaster recovery site.

• **Cold site.** A shell, complete with wiring, raised flooring and air-conditioning, that the firm can use as a temporary data center. Arrangements must be made with the firm's hardware vendor for the replacement machines.

• **Warm site.** An offshoot of the cold site, this shell facility includes communications lines.

• **Hot site.** A complete data center into which the firm can move with its systems and continue operations until its own data center is rebuilt or until it gets the replacement hardware so that it can move to a cold site. Firms should be prepared to pay dearly for a hot site.

• **Redundant data center.** For companies too large to fit into hot sites and with pockets deep enough to invest in a second data center, this is the ultimate disaster recovery alternative.

The expense is the big drawback here; it takes resolve — and money — to maintain a system for backup rather than for processing.

No matter what alternative a

company chooses, and no matter if it is for the central DP center or a distributed processing center, Epich says a basic disaster recovery plan should include two things.

One, the firm should appoint a response team. It should designate people in advance and assign responsibilities in case of disaster.

These can range from ordering new hardware to resurfacing the off-site data to notifying families in case of injuries.

Two, the company needs to know where it can access the things it cannot get its hands on after the disaster happens. That includes data, forms, equipment, phone lines and computing power. "There's all sorts of things you have to plan and do, and only

Continued on page S6

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# Approach your hot site as home away from home

Hot sites are cropping up all over. This variety means a wider choice and some leeway when the time comes for an organization to negotiate a hot site agreement. Users, vendors and consultants have suggested the following factors to keep in mind when making a choice.

**Price.** The usual agreement calls for a monthly fee, a one-time declaration charge when a firm declares a disaster and moves into the hot site and a daily fee once the company is up and running at the site. Frequently, however, some of these costs are negotiable.

For example, Sysgen Recovery Services, Inc. in Waukegan, N.Y., waived the disaster declaration fee for Columbia Regional Hospital in Columbia, Mo., because the hospital signed its contract within six months.

Furthermore, what cannot be negotiated may be covered in other ways. Dennis Spices, associate executive director of the State Universities Retirement System of Illinois in Champaign, says that business interruption insurance can cover both disaster declaration and daily running costs, which would leave the monthly fee as the only nonreimbursed cost.

Wayne Edge, president of the Hotsite division of Compusource in Cary, N.C., says users should also ask whether a vendor offers graduated cost options.

If, for example, a firm agrees to be bumped from the hot site to allow another firm in, it should expect to pay less. Conversely, if a firm wants the right to move other systems out of the hot site because of the critical nature of its business, that company can expect to pay a premium. Consolidated Edison Company of New York, Inc., for example, pays a premium to ensure sole access to its hot site in the event of a disaster.

**Compatibility.** In its most obvious sense, compatibility means choosing a site that caters to the hardware brand a firm uses. A growing number of firms are offering hot sites for non-IBM hardware. The term also means that the hot site upgrades and maintains its hardware to reflect technology developments.

In addition, compatibility refers to choosing facilities that are a realistic match for a company's systems needs. Smaller shops do not need 15 million instructions per second (MIPS) of equipment. A rule of thumb, Edge says, is to look for a site that can provide 60% of what a firm runs on at home — for example, a 10-MIPS shop could back itself up with 6 MIPS of equipment.

**Location.** Transporting personnel over a long distance can add greatly to the cost of coping with a disaster, so it is preferable in most cases to choose a hot site that is close to a firm's operations. Besides savings in transport costs, having a site nearby can mean faster setup, shorter hot site time and employees who are more content.

It may also be a good idea to look for hot site vendors with multiple locations. If the closest site is occupied, a firm will then have an alternate.

**Commitment.** Check the site provider's track record: The expense of main-

taining equipment, coupled with long sales cycles, means there is a high probability that some vendors now in the market will not remain there and that new ones may not succeed. According to Compusource's Hotsite division, 23 companies have left the business since 1978.

**Telecommunications flexibility.** This is an often-forgotten consideration, the importance of which is underscored

by the May fire at Illinois Bell. Firms should examine the hot site's access to networks, its drops to the nearest central switching office, the modems and multiplexers available to hook into, overall communications policies and contingency plans for regional disasters.

## Every bit counts

Organizations should also keep in mind that the data center may not be the only facility that will need to be relocated and that systems-related elements are not necessarily all that should be considered when evaluating hot site options.

Raymond Epich, vice-president of The Diebold Group, Inc., a N.Y.-based consulting firm, advises users to consider the availability of hotel space, office space and

all of the normal office products — down to paper clips — when planning for an alternate data center.

The U.S. Postal Service can verify the wisdom of that advice. After a fire shut down all computer operations at its Washington, D.C., headquarters in October 1984, the Postal Service had to move not only all its applications but also a total of 1,100 employees.

"Getting our system back up was one of our smaller tasks," says Rita Crawford, acting manager of DP security at the Postal Service. What was worse, she says, was dealing with the inconveniences caused by unforeseen shortages. Staffers had to double and triple up on telephones and stand in line for two restrooms.

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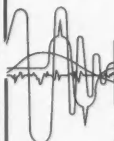
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## No such thing

FROM PAGE S4

about 5% are related to having a backup site for the computer," Epich says.

He adds that choosing an alternate processing method should come far down on the list, only after a lot of study and analysis. "It's sort of the last step,"

he says.

Off-site tape storage is the Ford Falcon of disaster recovery. It's cheap enough for everybody, and it's been around for a long time. EBMUD uses off-site storage as its only sure alternative.

"We have a 4381 and a 4341, but they're both in the same room on the same floor," Derry says. "If we had a major fire in

there, we'd be up a creek unless we could find somebody that could give us a place to run."

### Money problem

Although EBMUD would like to have a hot site arrangement, Derry says the cost is prohibitive. "Being a public utility, you really have to show major justification," he says. "You've got to build a real strong case to put it

past the board of directors, who have a hard time understanding 90% of what we request from them anyhow because they're totally non-DP-oriented."

By most accounts, reciprocal agreements simply do not work. Dennis Spices, associate executive director of the State Universities Retirement System of Illinois in Champaign, says his organization gave up on its recip-

rocal arrangement.

When Spices put that agreement to a test, the reciprocating partner said his operator had to come in at 4 a.m. on Saturday and be out by 8 a.m. Monday. "We felt we might be liable if we couldn't get the system back to them," he says.

Wayne Edge, president of Hotsite, a division of Compusource, calls reciprocal agreements "one disaster waiting to impose itself on another disaster."

**R**ECIPROCAL agreements are "one disaster waiting to impose itself on another disaster."

WAYNE EDGE  
COMPUSOURCE

If a firm wants to use a reciprocal agreement as its disaster recovery alternative, he suggests that the agreement be drafted by company attorneys and signed by company officers.

Service bureaus do not fare much better than reciprocal arrangements. "Service bureaus are really geared toward production," the University of Hartford's Dillman says. "Their mission in life is to provide data processing for any number of companies. To use a service bureau [as a disaster recovery plan], a lot of innocent companies would get kicked off the air."

EBMUD's Derry looked into service bureaus but says he had problems with remote requirements because the bureaus did not have the support for the communications the utility needed.


Although he could work around that lack of support, Derry says he is not too confident in the service bureau's ability to stand up to a real disaster. "It's all spit, chewing gum and baling wire," he says.

### The latest trend

Electronic vaulting is the new kid on the disaster recovery block. The speed at which backup data can be retrieved and the savings in transportation costs make vaulting an attractive alternative in the off-site storage arena. But it's still only storage — just data waiting for a place to go.

Shell facilities come in three temperatures — cold, warm and hot. According to Dillman, the school maintains a "warm" site on its campus, consisting of 4,000 square feet in the operations and maintenance building. It is equipped with air-conditioning and communications links to the school's on-line systems.

If the university's main data center with its IBM 4381 were to become inoperative, Dillman



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says he could be up and running, completely wired and on-line, in three or four days.

An alternative within the shell arena are rolling cold sites, such as those offered by Provident Recovery Systems. Mobile data center modules — complete with cabling, generators, air-conditioning and raised flooring — can take the place of a stricken data center in case of disaster. Arrangements for replacement hardware can be made through Provident or handled by the client company.

If tape backup is the Falcon, then hot sites are the Cadillacs of disaster recovery — not everybody can afford one, not everybody needs one and not everybody wants one.

But for companies such as banks and hospitals that have to maintain service no matter what, hot sites are the only viable alternative.

#### No time to wait

Karen Taylor, director of data processing at Columbia Regional Hospital in Columbia, Mo., says the medical center has a contract with hot site vendor Sysgen Recovery Services, Inc. in Waukegan, N.Y. The ability to get up and running quickly was a major consideration.

"In a hospital, you're running

24 hours a day, seven days a week, 365 days a year. You don't have a whole lot of time to wait around," she says.

Also important was the fact that the Sysgen hot site was compatible with the hospital's Data General Corp. MV/10000. "Data General is a big manufacturer, but it's not Big Blue. There's not a whole lot of people out there who have this kind of recovery for a Data General," Taylor says.

Taylor says she expects hot site vendors to increase their machine mix to match the needs of distributed DP centers and to market to non-IBM shops.

For instance, Weyerhaeuser Information Systems supports IBM, Hewlett-Packard Co., DEC and Honeywell Bull, Inc. hardware at its hot site in Washington state. Edge says CompuSource is "actively pursuing hardware other than IBM."

If hot sites are expensive, the cost of maintaining a separate data center is excessively so; nonetheless, it does make sense for some firms.

Bill Eldridge, technical manager at Travelers Insurance Co., says the firm's Hartford, Conn., data center is matched by one in Norcross, Ga. The firm has several IBM 3090s and 3084s at each site.

In case of disaster, the company has decided on a priority of applications that it will run at whichever site is active. The Norcross site was chosen because it was geographically separate from the Hartford power grid, Eldridge explains, nearly eliminating the possibility of a double disaster.

ter to wind up spending \$150,000 to \$300,000 every year for hot site support that will probably never be needed."

#### Users first

Myers says his approach is to focus on the users, not the DP managers, and to devise a plan that puts full responsibility for

they have become accustomed to using data processing as a service organization, does not mean that data processing has the responsibility for getting out payroll. They do not."

While some firms may be able to operate up to 45 days without the DP center, as Myers suggests, others do not enjoy that luxury.

Banks, for instance, are required by law to have a tested, verifiable recovery plan. They cannot close their doors for more than 36 hours or the government will shut them down. Dillman says he expects to see the same kind of regulations in the health, insurance and financial services industries by the 1990s.

But in the end, law or no law, it is a company's commitment to endure flood and fire, hackers and hurricanes, shutdowns and saboteurs that will move it toward disaster recovery planning.

"What makes contingency planning really work is not that a regulator tells you to do it," consultant Isaacson says, "but that senior management understands how, as we get more dependent on technology — no matter what form it takes — the cost of maintaining the survivability and the availability of that technology becomes part of the cost of doing business." •

## BUSINESS CONTINUATION planning is a people problem, not a technical issue."

KENNETH MYERS

K. N. MYERS & ASSOCIATES

Keeping a second data center free enough to operate as a backup center takes resolve. "It's a commitment from upper level management and a processing center to survive in that business," AT&T's Weyhausen says. The need for it goes back to how critical the DP functions are to the company's survival, she says.

It is that focus on the data center that bothers consultant Myers. "I think [the focus on the data center] could be a millstone around an MIS director's neck," he says. "It's not unusual for a medium- to large-scale data cen-

business operations in users' hands, even if it means doing manually what the computer automated years ago.

"The very same people whom you would think you'd cut their arms off if the system were down for 15 to 20 minutes ... will find ways they can operate without the mainframe for periods as long as 30 to 45 days," he explains.

"Business continuation planning is a people problem, not a technical issue," he says. "Just because on a day-to-day basis [using the computer for routine tasks is] easier for users, and

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# No vaccine to ward off effects of virus attacks

BY BELDEN MENKUS

Computer viruses pose a new threat to the health of information systems. They have demonstrated the potential to disrupt computer activities as thoroughly as a fire, flood or tornado. Furthermore, viruses appear, at present, to be far more difficult to protect against than any of these more familiar threats.

A computer virus is a code that infects other programs and causes them to do things they were not designed to do. These actions may be comparatively innocent, such as displaying a cartoon character or some form of graffiti. Increasingly, however, computer viruses have become malevolent, involving disorganization or erasure of disk content directories or actual contents on the disk.

These germs of destruction will most likely sweep through whole organizations, disrupting the operation of large critical information systems. Further-

more, while total paralysis of a company is not usually the intent, the focus of attacks seems to be shifting in that direction. Assaults on individual disk files are evolving into attempts to vandalize interconnected disk arrays supporting mainframes and efforts to interdict the operation of large communications networks.

The types of systems that could be devastated by such an attack include those engaged in communications traffic switching, on-line medical condition monitoring, — which is no longer isolated in self-contained intensive care units — electronic document interchange, electronic funds transfer and what is currently being described as screen trading of various types of securities.

## Super version of Trojan horse

Viruses are the latest refinement of a type of rogue program — known as a Trojan horse or a logic bomb — that has plagued data processing in a much more minor way for at least 20 years. While Trojan horses and logic bombs are typically created to damage and destroy, a couple of critical differences exist between these

older code-embedded infections and today's viruses.

To begin with, most detected Trojan horses and logic bombs have resulted from the activities of insiders; most viruses appear to be introduced from the outside. Increased reliance on sustained operation of large interconnected DP activities has exposed organizations and their critical systems to this sort of vandalism by individuals not directly connected to the system under siege.

Second, Trojan horses and logic bombs are essentially uncontagious — they go off when the proper conditions have been fulfilled and then become inert. Viruses, on the other hand, have been designed to replicate themselves. In many instances, the virus copies itself to various readily accessible memory locations each time it is activated. Potentially, each successive virus copy can be activated independently and reproduce itself, thus furthering the chain of infection.

Typically, virus-contaminated programs are downloaded from an electronic bulletin board. However, in at least one instance, the infected software arrived on a disk in packaging regularly used by the program's developer. There is no evidence that the developer of the infected software made a deliberate attempt to corrupt its products.

People who develop computer viruses appear to be concerned mainly with demonstrating their power to other computing professionals — they do not appear, at present, to be concerned about the disruptive consequences of their actions.

## In sheep's clothing

A computer virus may operate on its own, but most often, it is attached to some other apparently innocent program. While no broad-based effort to spread specific computer viruses seems to exist, the same viruses have appeared selectively in various parts of the world. In one instance, one launched in Pakistan showed up in Pennsylvania, Maryland and Europe. Viruses have been detected in copies of numerous widely used programs.

Equally worrisome is that the structures of viruses seem to be becoming more sophisticated. For instance, some have demonstrated an ability to respond to the user of the infected system with spurious — but apparently legitimate — messages before attacking. And the next generation of viruses is expected to be able to selectively modify program and file content rather than destroy it, as is the current practice.

Virus filters — a class of programs designed to detect viruses before they can infect either data or programs — have shown only limited success in catching a virus before it can infect the main program. Most use some form of check-sum calculation, in which various factors are used to verify that the same information resides in the file, to indicate when unauthorized code may have been added to a program.

Generally, filter designers assume that the virus code will be located at or near the front of the program. Thus, the check-sum calculation may be limited to perhaps the first 100 lines of code. These

designers also assume that the virus will be of sufficient size to be readily identifiable as an unauthorized modification. Unfortunately, some viruses have appeared at the end of a program, and it has been demonstrated that a workable virus can be reduced to three lines of code.

There is every reason to believe that future generations of viruses will be hidden at the end, or even in the center, of a program. It is also likely that some may be distributed as code segments throughout the program, to be assembled later when a triggering event or time is reached. Viruses have also been discovered masquerading as a bad disk sector while they await activation. It is highly doubtful that the existence of an extra bad sector would be readily recognized.

In addition, spurious versions of virus filters to which viruses have been attached have also appeared.

## A cure?

Computer viruses are a major security threat. And some time may elapse before that threat is discovered.

The number of attacks experienced to date appears to be far greater than indicated by reports in the general news media and DP trade press. For instance, a request placed in one metropolitan area electronic bulletin board for reports of virus attacks generated reports of more than 100 incidents in a few hours.

Various strategies for limiting virus infection have been proposed. For instance, one approach suggests that the absolute isolation of a virus in the Intel Corp. 80386 microchip environment is possible because a 386 machine can be partitioned into numerous virtual machines. This capability supposedly keeps material from one part of the machine from moving into other parts.

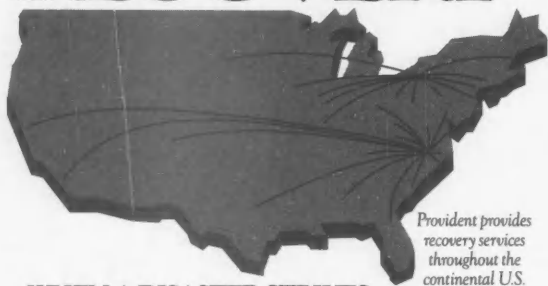
Another suggested approach is to issue program code in a nonmodifiable compact disk/read-only memory form rather than on a conventional write-many erasable magnetic disk. Again, it does not appear that either of these protective approaches can be realized on any broad basis before the early 1990s, since early reactions have indicated that both user and vendor acceptance will be slow.

While the risk of infection cannot be eliminated yet, the following risk-reducing actions seem prudent in the interim:

- Restrict downloading of files and software from electronic bulletin boards.
- Limit the use of software products — including commercially developed packages, "freeware" and "shareware" — that have not been independently verified to be virus-free.
- Design interfaces to network gateways and other telecommunications ports that prevent direct access from outside-to-disk content.
- Segment data center-resident direct-access storage device interconnection — and the program that manages the use of this space — to reduce the possibility of virus infection of mainframe-supporting memory.

Reducing the threat posed by the new disaster vulnerability that computer viruses represent will lead to other changes in the way computing has customarily been done. ●

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# PC packages will assist but not carry

BY TARI SCHREIDER

After surveying the carnage left by the recent rash of data center disasters, many MIS managers are anxious to acquire prevention planning and risk assessment aids that will help them size up and address vulnerabilities.

Currently, 44 personal computer-based disaster recovery and risk-estimation software packages are on the market, with prices ranging from \$450 to more than \$35,000. While the oldest has been available for 15 years, most have come to market in the last two years, and another five are scheduled to debut in the next six to 12 months.

PC-based disaster planning development software is composed of a word processing system, project management

ten present users with large amounts of information without offering an analysis of that information or taking into account critical areas such as evacuation procedures.

Most packages also neglect an area crucial to most organizations today — the personal computer. But a new generation of reasonably priced software will address the end users and companies that do all their processing on PCs and local-area networks. These products are designed

with expert shells and can be used immediately.

Most vendors in this arena are small to medium-size companies that are usually willing to work on bettering their products with their clients, a direction that clients should pursue.

In too many instances, disaster planning packages are purchased only to pacify corporate auditors. This state of affairs has not escaped the attention of vendors. In fact, many aid and abet this dangerous

practice of using products to come up with a quick and easy plan that looks good on paper but is no help in preventing or limiting a real disaster. More than half of the PC-based software packages available offer "canned plans" for this purpose.

The need for effective disaster recovery plans cannot be overemphasized. The development of an effective plan should be thought of as a journey, not a destination. It is a process that occurs throughout the life of the MIS organization. This makes self-sufficiency a necessity, not just a luxury.

In the hands of an experienced disaster recovery coordinator or security officer, PC-based software packages offer incredible time savings in developing a business resumption plan. •

**T**HE DEVELOPMENT of an effective plan should be thought of as a journey, not a destination.

software and a series of templates and forms. Most of these products are useful planning adjuncts when applied to the right setting and used in the correct way.

The best approach is to use the software to supplement your efforts rather than expect it to do the entire job. The catch is that these products cannot be chosen at random as a quick fix. Each offers its own idiosyncrasies and limitations. Most deal strictly with the recovery of the data center, although some of the more sophisticated offerings encompass the entire corporation.

## No two alike

Not all products are equal in terms of ease of use, but that aspect can be easily checked by looking at the internal word processing system at the core of the package. When evaluating PC-based disaster recovery packages, look for those that offer risk-estimation models as an integral component rather than as a separately purchased tool.

When evaluating these packages, it is more important to establish the developer's expertise on disaster recovery than the elegance of his code. Packages that are little more than a series of checklists can create plenty of information but few plans. For the most part, however, problems using PC-based disaster recovery software have little to do with the programs' quality and a lot to do with how and why the packages were purchased. Too often, organizations make their selections on the basis of bells and whistles without first thinking about how they logically do business.

As a result, many companies have picked a product in haste, only to discover that either the field for the department code was too small, the documentation was so poor that it made the product virtually unusable or the product was no longer supported.

In addition, such software packages of-

Schreider is president of Contingency Planning Research in Glenwood, N.Y.

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# Begin contingency planning, or you might become an outlaw

SANFORD SHERIZEN and ALBERT BELISLE

As several recent incidents illustrate — telephone switching center outages, widespread flooding and high-rise fires — information processing is highly dependent on conditions outside the control of many, if not most, businesses.

The only way to regain a measure of control is for managers to make contingency planning a priority.

While this is a sound rationale to justify the necessity of contingency planning, it is not sufficient to make companies decide to act now. Most businesses continue to treat planning for disaster management and recovery as a matter of secondary importance.

What will make contingency planning an integral part of corporate strategic planning are government or court mandates. This kind of planning will become the norm when managers start being evaluated on how well their preparations meet certain planning criteria.

The model for such required management attention is cur-

rently found within the banking community and will soon be imposed on other industries. By understanding what bank management has to do, managers in other industries can be prepared for what the future may hold for them.

## Banks and the OCC

The Office of the Comptroller of the Currency (OCC), an agency of the U.S. Department of the Treasury that regulates and examines the operations of national banks, has recognized contingency planning as an essential aspect of bank operations and planning. Accordingly, it has issued several banking circulars concerning mandatory preparedness of national banks to resume critical functions.

The OCC first issued a contingency planning requirement in 1983. While it was primarily concerned at first with the recovery of the data center and its ability to provide data processing services, the OCC has since expanded its definition to include contingency planning for key operational areas of banks.

More recently, these concerns have extended into contingency planning for microcomputers.

Contingency planning for information systems under the OCC's guidelines requires managers to do the following:

- Determine the critical functions of the bank.
- Define the objective of information technology in the corporate strategy.
- Define the bank's communications needs.
- Determine the critical information system of the bank.
- Assess the risk and impact of loss of data, use of incorrect or untimely data or the loss of DP support on critical functions.
- Develop the means to reduce the impact or risk to a prudent level.
- Establish controls for information processing.
- Determine the best organizational structure for information processing.
- Establish guidelines for coordinating the acquisition of hardware and software.
- Coordinate distributed users.

Under these regulations, a bank's management is held accountable for the soundness of its contingency plan and its periodic testing. An assessment of the plan's adequacy must be provided annually to the bank's board of directors, which is responsible for the review and approval of such an assessment. This annual review must be noted in the board's minutes and verified at each OCC examination of the bank.

While these regulations apply only to national banks, they have many implications for nonbanking management as well. Recent disasters affecting a spectrum of industries have pointed to the good business sense of developing a thorough contingency plan.

There are already an increasing number of laws defining acceptable business practices. Legal attention will soon be paid to failure to survive a major business interruption, which will be considered a malfeasance of duty. This attention may serve to open a wave of lawsuits concerning implied service agreements within contracts.

To reduce the liability exposure as well as mitigate the devastating results of a major business interruption, companies would do well to prepare a documented and tested business interruption plan.

## Step against disaster

MIS managers can take a number of steps to ensure that contingency planning is performed in a manner that adequately pro-

fects the business from excessive loss and shelters themselves from liability.

• **Conduct a legal audit.** Undertake a legal audit of computer systems to determine the ramifications of inadequate disaster control and recovery. Determine what is at stake if immediate recovery is not possible. Examine who the law or regulations might hold responsible and whether contingency planning is sufficient to meet such laws. Be sure to ask specific legal liability questions.

• **Set managerial roles.** The manager in charge of contingency planning should primarily focus on information as a strategic organizational resource. Since

and its contingency plan should reflect that. Adequate resources for contingency planning tend to be provided once managers realize the importance of disaster management and recovery to their personal as well as corporate futures.

• **Extend controls.** Determine how reliant your DP system is on the contingency plans of other companies providing telephone, electric power, flood control and other essential services. Ask these organizations questions about their contingency plans. What are they doing to prevent or minimize disasters? Also consider whether your organization must strengthen particular aspects of data processing, including

specialized distributed processing and redundant systems.

• **Rethink cost/benefit analysis.** Planning and preparing for surviving a disruption costs money and resources. However, the cost of being un-

prepared can also be staggering. Managers must consider the possibility of not being able to recover data, the negative public image that may arise — resulting in loss of customers — costs of recovering the system, formal inquiries from stockholders and governmental agencies or even, ultimately, not being able to continue to function as a business.

The message to management should be clear. Instituting tested contingency plans makes a leading-edge company. Having no plans makes a bleeding-edge company. Soon the choice will be out of a company's hands. •

**LEGAL attention will soon be paid to failure to survive a major business interruption, which will be considered a malfeasance of duty. This attention may open a wave of lawsuits concerning implied service agreements within contracts.**

information crosses many departmental lines, this manager should have enough political power to handle these boundaries.

As a champion of contingency planning, this manager should point out to senior executives the OCC views of management responsibilities and how this may serve as requirements for their industry in the near future. Managers should realize that contingency planning is not just a technical issue.

An organization should look at data processing as a way of achieving its business objectives,

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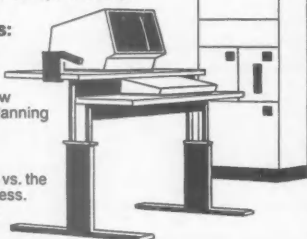
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# If you can't afford to wait . . .

*Experimental and costly, electronic vaulting isn't viable for everyone*

BY TARI SCHREIDER

Most companies do not have procedures capable of creating absolutely safe backup on a real-time basis; the majority does not need that level of protection. There are, however, firms with critical applications that are worth up to \$20,000 a minute.

For that kind of site, the ability to recover at the exact point of failure represents both a significant competitive advantage and a sound financial strategy. It is for this group of users that electronic vaulting may make sense.

Electronic vaulting — the technology of real-time duplication and transfer of critical data to an off-site but connected system — is currently being heralded as the next wave of disaster recovery. The early players in the field are investing millions of dollars to position their offerings, but the technology is neither as revolutionary nor as affordable as these vendors would have users believe.

## A decade old

The basic technology of transmitting production data to direct-access storage device (DASD) farms has been available for nearly 10 years. Airlines, federal agencies and other large data-dependent users have maintained proprietary systems of this kind for some time.

These systems were relatively primitive, acting as little more than off-site tape vaults with communications capabilities. But electronic vaulting that enabled nearly instantaneous interactive access to stored data has not, until recently, been commercially feasible.

In fact, electronic vaulting is still not economically attainable for most organizations. The cost of providing this service ranges from \$2,500 to \$25,000 per month, depending on DASD, line speed and tape storage requirements. As with most new offerings, this price should drop significantly as more products come on the scene. However, cost is not the only inhibiting factor. The complex technology involved in providing reliable real-time data transmission and access is still largely unproven.

There is nothing proprietary about the technology of electronic vaulting. Most of the vaulting firms have developed their offerings by packaging generally available hardware and software products. The exception is Televault — a product by consulting and engineering firm Total Assets Protection, Inc. — which has developed its own proprietary linking and data capturing software.

Each provider of electronic vaulting carefully chooses its words when describing its service. Terms like "shadowing," "mirroring," "real-time journaling" and "production assimilation" are all used to differentiate one product from another.

Currently, only three players have committed themselves to this newborn commercial market. Disaster recovery giants Comdisco Disaster Recovery Services, Inc., with its E-Net service, and Sungard Recovery

**T**HE only ones to make money at [electronic vaulting] are the consultants running around telling everyone they need it."

PAUL CATALANO  
DATAPORT, INC.

Services, Inc., with Sunval, are offering electronic vaulting to a data center. In these situations, data is transmitted to an operational data center — in this case, a hot site — thus allowing users to immediately retrieve data from backup if needed.

Televault, first announced in late 1986, offers backup transmission to tape drives and DASDs only. This means users must have access to a computer facility to retrieve data if their primary processor fails.

In spite of announced products by all three vendors, none has yet to produce an actual customer, and our research indicates that the revenue generated by electronic vaulting in the next 16 months will be less than \$1.5 million.

## Second thoughts

The father of electronic vaulting, Paul Catalano, chairman of New York-based Dataport, Inc., has gone on record as having second thoughts about electronic vaulting as a commercial enterprise. In early 1986, Dataport, one of the country's largest off-site tape storage facilities, announced it would be the first large commercial data storage center to offer electronic vaulting through fiber-optic links.

But now, Catalano says, "Electronic vaulting at this point is integrity insurance that most companies are just not prepared to pay for. The operational advantage is outweighed by cost. So far, the only ones to make money at this are the consultants running around telling everyone

they need it."

Provided an installation has the communications expertise, developing a homegrown interpretation of electronic vaulting may be an option. As in any make vs. buy decision, the costs involved need to be considered, as do the potential write-off incentives. In addition, a company needs to consider whether it wants one organization — its hot site service — to be responsible for all its recovery needs. Traditionally, hot site and off-site storage services are separate.

The electronic vaulting firms currently seem to regard off-site storage companies as competition. And the sense of rivalry seems to be mutual, since off-site tape storage companies universally maintain that their customers' data is far too important to entrust to an unproven technology. Eventually, however, the two sides may collaborate in fostering electronic vaulting.

Comparing that technology with conventional tape storage vault facilities will quickly show that justifying electronic vaulting by replacing your storage vault vendor is impossible — unless you plan on eliminating the pickup and storage of 20,000 tapes. Electronic vaulting firms will need to develop strong alliances with off-site storage companies in order to gain a strong hold on the larger market of traditional tape backup and storage.

## Prime considerations

In considering electronic vaulting as a backup alternative, users should consider a number of questions. Should the data reside in the electronic vault longer than the time it takes to ship a backup copy? Should you select a firm that vaults to tape or one that vaults to DASD? Should you develop your own strategy for vaulting or agree to be a beta-test site for an unproven alternative? What security standards have been set to safeguard the transmitted data?

Does the benefit of real-time data access outweigh reconstructing data to the point of failure? Should you use the thousands of dollars a month you would spend on electronic vaulting to clean up backup procedures first? Is it risky to allow your hot site company to also store your vital records?

No one but the potential user can answer these logistical and financial questions. In fact, nothing about electronic vaulting is absolute right now; the boundaries of the technology are being drawn as both users and vendors feel their way forward. ■

# Proposal for control threatens halon output

BY GLENN YOUNG and ANDREW CLARK

Protecting data centers from fire-related destruction is about to become trickier as a vital component of fire suppression — halon — edges closer to becoming a controlled commodity.

The ideal means of suppressing fires is a halon system supported by a sprinkler system. Halon is a safe, colorless, odorless and nonconducting gas typically built into the ceiling or under the floor of a computer room.

However, the U.S. recently signed an international protocol calling for limitations on halon production, raising questions about the gas's long-term viability as a fire suppressant.

In September 1987, a group of 24 nations signed an international protocol, or formal preliminary memorandum, outlining steps to protect the Earth's atmosphere from destruction by chlorofluorocarbons (CFC), used in refrigerants and propellants, and halon. Adjustments in production volume are proposed because when released into the atmosphere, these chemicals have a damaging effect on the ozone layer, the atmospheric layer that protects the earth from overexposure to the sun's ultraviolet rays.

## Low-level threat

Halon is considered less of a threat than CFCs because it can be tracked and because most supplies remain in containers as a hedge against an event that may not ever occur. For these reasons and because of its reputation as a valuable fire suppressant, production of the gas will not be cut in the same way as CFC production. Instead, according to the protocol, manufactured output will be capped at 1986 levels, effective in 1992.

The protocol does not take effect until it officially becomes a treaty, which should happen later this year. The treaty terms would not become law until three years after that, which means there will probably be no move to cap halon production before 1991 or 1992.

In the U.S., the prime enforcer for the treaty is the Environmental Protection Agency, which says it intends to release its own rulings on halon next month.

Although an actual halon shortage will probably not occur anytime soon, prices are likely to begin a steep climb unless one of

two things happens: the industry finds a substance that can offer the same protective features halon does at the same price, or conditions change in a way that will permit the cap on halon production to be raised.

Hope for the first occurrence is rather dim, but the second is a real possibility, since the protocol allows a nation to increase Group II — halon — production if it reduces Group I — CFC — production accordingly.

## Handle with care

Even though this possibility does exist, data site managers would be well advised to consider how

**H**ALON is considered less of a threat because it can be tracked and because most supplies remain in containers as a hedge against an event that may not ever occur.

to effectively manage their halon supplies.

One alternative is to install a pre-action sprinkler system. This system is initially activated by an alarm, which causes pipes above the computer room to fill with water. Water is discharged only when indicated by the heat from each individual sprinkler.

Accident-proofing halon systems would be advisable at this point to reduce or eliminate the possibility of unintended discharges. This would also be a good time to devise testing procedures that do not require halon discharges.

Unless released by a so-called fire-related event, halon remains contained indefinitely. Statistics given by one manufacturer indicate that 80% of the halon produced since 1965 is still contained. The other 20% was emitted during fire-related events, testing, training and accidental discharges. By eliminating these three types of nonessential emissions, extending the supply of halon is a possibility, thereby at least partially mitigating the effects of the production cap.

Users should not dismiss halon use out of hand. Living within the production constraints of this clean, effective fire suppressant is manageable as long as the facilities designer and manager are aware of it and plan a corrective course of action. ■

Young is a director and Clark a consultant at Coopers & Lybrand's Houston Management Consulting Services Practice.



# What is fault tolerance, anyway?

BY BARBARA SEHR

When you hear the phrase "fault tolerant" these days, it's a good idea to ask for a definition.

Until recently, the term carried with it a very specific meaning. It was commonly understood that a fault-tolerant system was one that featured redundancy in its processors, drives and other peripherals, establishing, in effect, a backup system for itself.

The processors in such a system work in parallel, and its operating system software is designed to sense an impending failure in one processor and automatically switch the system to another.

These days, however, as concern about protecting corporate information from the effects of disasters escalates, the term "fault tolerant" is being used in a much more generic way to appeal to a broader base of users. While the traditional view of a fault-tolerant system has been a redundant parallel processor,

the current market has stretched this definition to include systems that will not break down under most circumstances.

## Changing times

Fault-tolerant systems, introduced in 1976 by Tandem Computers, Inc., were initially aimed at users who would pay a premium for a critical need. Customers were primarily banks and manufacturing companies that could not afford a breakdown in computing power for even a few minutes.

A number of companies, such as Tandem, Stratus Computer, Inc. and Parallel Computers, Inc., currently market fault-tolerant systems.

But other firms, such as Sequent Computer Systems, Inc., are now also offering "high reliability without the expense of fault tolerance" with some success, according to Kent Godfrey, Sequent's manager of market segments. "We find most customers do not want to pay the cost of fault tolerance in ex-

change for the benefits received," he says.

Talk about fault tolerance has even reached the personal computer level, where on-board redundancy is offered. Atlantic Microsystems, Inc. has developed a board that writes all data on an IBM Personal Computer AT hard disk simultaneously to a second hard disk — transparent to the user. A more costly system provides mirrored file servers to a set of two IBM PC ATs on a local-area network.

Joseph Flack, marketing manager at Atlantic Microsystems, says the boards produce a degree of fault tolerance that is close enough for most applications.

Robert Stafford, an independent consultant, recently conducted a study of the fault-tolerant market for Frost & Sullivan, Inc. in New York that projects the market for fault-tolerant sys-

tems will nearly double its \$2.5 billion 1987 sales by 1990.

That growth, Stafford predicts, will result from the migration of fault-tolerant technology into nontraditional environments such as the office, with emphasis placed on the systems' reliability.

Stafford, however, makes it clear that he thinks of fault toler-

ance and engineering department at the University of Texas at Arlington, maintains that there is an important difference between fault-tolerant and high-reliability systems.

Fault tolerance implies a significant amount of redundancy in major components, he says. These types of systems are critical in life-threatening or potential business disaster situations.

"If I were on an airplane controlled by a computer, I would want that control system to have a degree of fault tolerance," Carroll says.

The market for systems that can take over in these situations is still growing, he adds, and will provide expanded growth for fault-tolerant systems in the future.

## Instant info

Patricia Seybold, publisher of the "Office Computing Report," says the demand for instantaneous data could eventually trigger the movement of fault tolerance into the office environment.

"It has always seemed that at some point, [fault tolerance] would move [into the office],"

*Continued on next page*

**W**HEN PEOPLE demand hourly rather than monthly reports, fault tolerance will become a critical need."

PATRICIA SEYBOLD  
"OFFICE COMPUTING REPORT"

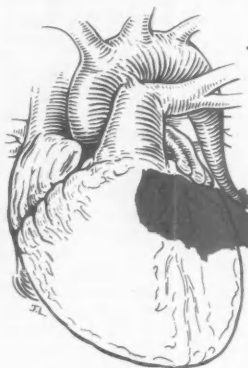
ance in broad terms: "In a way, fault tolerance is a state of mind." Stafford adds that in many cases, the terminology of fault tolerance and high reliability is used interchangeably: "It's terminology more than anything else."

Other market watchers who are stricter in their definitions are less convinced that organizations are ready or able to support fault-tolerant computing throughout their operations.

Bill Carroll, a professor and chairman of the computer sci-

Sehr is a free-lance writer based in Seattle.

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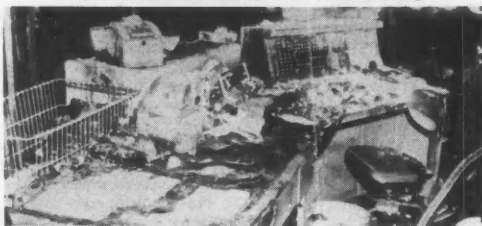
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## ASK THE VENDOR

The following questions were solicited from users and conveyed to the vendors for responses.



**We are currently using Sungard Recovery Services' disaster recovery services, and we may wish to take advantage of its recently announced Sunvalit televaulting services. How can we implement televaulting using my currently installed IBM Systems Network Architecture network while ensuring the integrity of our corporate data using Integrity Solutions' Data Recovery System?**

**Frank Diasparra**  
Vice-President, Advanced Technology  
Fidelity Investments Development  
Boston

**INTEGRITY SOLUTIONS, INC.:** Our Mirror Image Processing product family, which will support the televaulting process, will be delivered during the second half of this year. It will utilize facilities of our Data Recovery System while providing options for both channel extension and LU6.2 technologies. Currently, Sungard's Sunvalit service supports only the channel extension technology provided by Data Switch Corp.

**What backup provisions does Panamax's surge protector provide in the event of failure? What kind of warranties does Panamax offer if the protected equipment is damaged?**

**Ed Conlan**  
Service Manager  
Delta Business Systems  
Orlando, Fla.

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**When is Essential Software going to develop an interface between Arise and tape libraries that automatically select the required backup tapes and create a tape pull listing?**

**Richard Harry**  
Transamerica Occidental Life  
Insurance Co.  
Los Angeles

**ESSENTIAL SOFTWARE, INC. (SHERMAN OAKS, CALIF.):** Arise Version 1.2, due to be released late next month, provides an interface to CA-UCC1 Tape Management System. The Arise interface routine creates a tape pull listing of either the current (0) generation or minus one (-1) generation of the direct-access storage device back-

up tapes. Arise uses the system catalog to obtain information, which is then passed to the tape management catalog to retrieve backup tape volume serials.

**Does AIM/Safe 2000 The Disaster Recovery Plan require any other software product or knowledge of any product for operation?**

**Ralph E. Jones**  
Data Processing Manager  
Association of the U.S. Army  
Arlington, Va.

**ADVANCED INFORMATION MANAGEMENT, INC.:** AIM/Safe 2000 requires no other software product and assumes no prior knowledge of any other software. It provides the guidance necessary to create a testable disaster recovery plan. •

## Fault tolerance

FROM PRECEDING PAGE

Seybold says, "especially in critical data environments such as law firms. When people demand hourly rather than monthly reports, fault tolerance will become a critical need."

That hasn't happened yet, however. Seybold says she has not seen even a trickle of fault-tolerant systems move into the office environment, mostly because the benefit has not yet justified the cost of true fault tolerance.

According to consultant Stafford, IBM's initial foray into fault tolerance in the form of an OEM marketing agreement with Stratus to market Stratus fault-tolerant systems under the System 88 name boosted the marketplace and fed speculation that IBM would soon develop its own fault-tolerant systems.

If it does, however, indications are that it will not be seeking a mass market in loss prevention. Robert Budnick, manager of the System 88 product line at IBM's Marketing Services Group, says he senses some new directions for fault tolerance with what he calls "a need for instantaneous access to critical data," such as retail point-of-sale systems. He adds, however, that he expects little demand for fault tolerance on the part of users who need only a surefire means of backup. "There are so many other less expensive ways to do that," he says. •

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Alicomp, Inc. (212) 473-5763	New York	Yes	Eight	3,000 or 15,000 (two sites available in New York)	IBM 9300-3090	IBM PC, PC XT, AT	3725 FEP; leased, dial-up lines; protocol converter; optional fiber-optic, microwave; IBM Information Network	Disk, tape drives; terminal; printers; card reader/punch	Eight/80	One per four blocks in Manhattan, one per two miles outside	Guards, private work areas	Yes	Yes	Disaster recovery planning; business interruption insurance audits; property, casualty insurance brokerage; mailroom, courier services; 24-hour hot line	None	\$500-\$6,000 per month	\$1,000-\$4,500
Backup Recovery Services, Inc. (913) 233-0368	Topeka, Kan.	Yes	2½	6,000	Unisys 1100	None	2,200 phone lines	Disk, tape drives; communications processors; printers	50/50 per computer	One per city	24-hour guard	No	Yes	Communications design, technical assistance	None	\$1,000-\$4,500 per month	\$100-\$350 per hour
Cadre, Inc. (203) 674-1285	Avon, Conn.	No	Seven	8,000	Burroughs B1990, B3995, V380, A6	None	80 dial-up circuits, multiplexers, modems	Printers, tape drives, 10G bytes of disk storage	Two per system/24	Limit by power grid	Internal/external security	No	Yes	Disaster recovery consulting	None	\$500-\$3,300 per month	\$75-\$125 per hour
Comdisco Disaster Recovery Services, Inc. (312) 696-3900	Wood Dale, Ill. (3 sites); Carlestadt, (3) North Bergen, (2) Cranford, Bridgeport, N.J.; Atlanta; Grand Prairie, Texas (2); Cypress, San Ramon, Calif. (2)	Yes	Eight	10,000-80,000	IBM, DEC, Tandem	None	1,800-3,600 wire pair; one-four T1, one-eight switched 56 kb lines	Impact, laser printers; 3420/3480 tape; DASD*	100 per site/NP	One per building	Card access, 24-hour monitoring	Yes	Yes	Contingency consulting services; electronic vaulting	\$10,000-\$40,000	\$1,500-\$21,000	\$2,500-\$20,000
Computer Assurance Corp. (404) 455-3993	Atlanta (two sites)	No	One	3,500 or 4,400	DG, DEC	None	34 ports off-site at 9.6K bps/sec; via voice-grade lines, customize communications	DG peripherals	150/50	Based on geographics, equipment required	Shielded computer room, off-site vaulting service	Yes	Yes	Up to 40 hours free test time, consulting	None	\$100-\$2,500 per month	\$500-\$2,500
Computer Recovery Facility, CR-TAP Computer Recovery (416) 821-2900	Mississauga, Ont.	Yes	Six	18,000	Amdahl 5890, Sperry 1100/91, System/38	IBM PC AT compatibles	Dial-up, leased lines; Data Pac; shared networks	Printers; terminals; tape, disk, DASD drives	160/NP	Three per half km radius	Card access, closed-circuit monitors	Yes	Yes	Recovery consulting, site design/construction, renovation, training	\$2,500-\$10,000	\$1,000-\$20,000 per month	\$1.25 per sq ft of space occupied monthly
Com-Site International (301) 953-1202	Beltzville, Baltimore, Md.; Richmond, Fairfax, Va.; New York; Chicago; Washington, D.C.; Boston; Raleigh, N.C.; Atlanta; Philadelphia; Miami	Yes	10	5,000-60,000	IBM, DEC, Honeywell Bull, Cray, Amdahl	IBM, AT&T, HP, Mac, Prime	Range of tele-communications hardware from IBM, NCR, Comten, Contel, Northern Telecom, Rolm, AT&T, Wang	UPS†, Halon	One-10 Five-50	Committee decision based on customer size, nature of operations	Security clearances, closed-circuit TV, 24-hour security	Yes	Yes	Comprehensive design/build capabilities	NP	NP	NP
Contemporary Computer Services, Inc. (516) 563-8880	Bohemia, N.Y.	Yes	14	12,000	IBM 4300, 3090, 3090	IBM PC, PC XT, AT or compatibles; Toshiba; AT&T; Compaq, Mac	25 dial-up lines	Printer, tape drives	Four/60	None	Fully alarmed, card access, tape vaults	Yes	Yes	Computer maintenance, installation, upgrades, reconditioning	None	\$800-\$6,000 per month	\$1,500-\$8,000
Continental Computer Assurance Corp. (215) 968-6000	Newtown, Pa.	Yes	Six	6,000	IBM 4300	None	IBM 3720, 3705; Memorex 1270; Paradyne PTK	DASD, full-system peripherals	60 per System/30	One per industrial park, urban office building	Motion detection, 24-hour alarm system	No	Yes	Contingency planning	None	NP	\$150
Corporate Contingency Services (313) 486-3110	New Hudson, Mich.	Yes	5½	25,000	IBM 4341, 3080, 3090	IBM PC, PS/2	200 pair telephone circuits; AccuNet reserve T1, 24 dial-up lines; dial backup units	DASD tape drives	80/500	Based on industry, geographics	24-hour security, card access, closed-circuit TV, motion monitors	Yes	Yes	Consultation for audit, risk management, security, disaster recovery, contingency planning	\$5,000-\$20,000	\$1,000-\$7,500	\$1,000-\$6,000

\*Exact location not provided at company's request

†Front-end processor ‡Direct-access storage device \*Uninterrupted power supply †IBM's Systems Network Architecture ‡Private branch exchange

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. Research assistance was provided by Datapro Research Corp. in Delran, N.J. When a vendor is unable to provide specific information about its product, this is designated NP (not provided). When a question does not apply to a vendor's product, this is designated NA (not applicable). Further product information is available from the vendors.

## DISASTER PREVENTION AND RECOVERY

## S P O T L I G H T

COMPANY	SITE LOCATION	OFFERS COLD SITES	YEARS IN BUSINESS	SIZE OF SITE (SQ FT)	HOST COMPUTERS SUPPORTED	MICROS SUPPORTED	DATA, TELECOMMUNICATIONS FACILITIES	OTHER PERIPHERALS PROVIDED	SITE CAPACITY: NUMBER OF COMPANIES/PEOPLE	SELECTION PROCESS FOR CLIENT COMPANIES	SECURITY PROVISIONS	PROVISIONS FOR OFFLOADING TO OTHER SITES	SITE LIABILITY INSURANCE COVERAGE	ADDITIONAL SERVICES AVAILABLE	INITIATION FEE	RANGE OF SUBSCRIPTION FEE	RANGE OF PER DAY / USE CHARGES
Dataguard, Inc. (216) 536-6373	Cleveland	No	Four	4,000	HP 3000 Model 950	None	100 lines coming in	Eight Eagle hard drives, tape drives, printers, UPS	75/30	One client per high-rise building	Card access, computers monitored	Yes	Yes	Off-site storage facility, recovery planning	None	\$1,250-\$2,150 per month	\$850 per day
Dataguard Recovery Services, Inc. (502) 368-2501	Louisville, Ky.	Yes	Four	15,000	Honeywell Bull DPS 6, DPS 8, DPS 88, DFS 90, DFS 8000	IBM PC, PC XT, AT or compatibles	Dial-up, Accumet reserve T1, switched 56 kb lines; X.25 network	Printers; card readers; punchers; disk, tape drives	NP	None	Entry security, security patrols, Halon, water detection, UPS	Yes	Yes	Vault security, office support, disaster recovery consultation	None	\$350-\$17,500 per month	\$350-\$7,500 per day
Data Processing Security, Inc. (817) 457-9400	Fort Worth, Texas; Indianapolis; Salt Lake City; Tulsa, Okla.; Honolulu; available last quarter 1988; Orlando, Fla.; Birmingham, Ala.; Charlotte, N.C.	Yes	Nine	8,000 - 33,000	IBM, Amdahl, Unisys (Burlington), NCR	IBM PC, PS/2	150 pair dial-up lines	Tape, disk drives; modems; printers; communications controllers	100/150	Six members within 1/4-mile radius of each other	Halon fire detection, closed-circuit TV, card access, badges, 24-hour security, water detection	Yes	Yes	Off-site storage; disaster recovery planning, prevention; facility construction, reconstruction	None	\$500-\$2,500 per month	\$100-\$250 per hour
Digital Equipment Corp. (617) 493-3467	Illinois*	Yes	Five	40,000	VAX 8650, VAX 750, PDP-11/70	DEC	Tymnet packet-switching, X.25, SNA*, Decnet networks	UPS, workstations	NP	Based on customer demand	Card keys, badge readers	Yes	Yes	Contingency planning, training, data protection center, maintenance	NP	NP	NP
	New Jersey*	Yes	Three	40,000	VAX 8650, VAX 780, PDP-11/70	DEC	Tymnet packet-switching network, direct-dial lines, Teletel	NP	NP	Based on customer demand	Card keys	Yes	Yes	Contingency planning, training, data protection center, media maintenance	NP	NP	NP
Disaster Avoidance & Recovery Services, Inc. (312) 364-9330	Arlington Heights, Ill.	Yes	Two months	7,000+	Amdahl, IBM, NAS	IBM compatibles	1,110 twisted wire, Accumet reserve T1 lines	DASD, tape, printers	50/120	One per five-mile radius	Any needed by subscribers	Yes	Yes	Automated disaster recovery tools, consulting, audits, construction	\$30,000	\$1,000-\$20,000	\$2,000
Disaster Control, Inc. (215) 355-7800	Warminster, Pa.	Yes	Nine	10,000	Unisys A15, V380, B1900	Unisys B20	150 dial-up, T1, switched 56 kb, leased lines	Printer; disk, tape drives; modems	NA	One per building or city block	Combination locks, electronic monitoring	Yes	Yes	Software consultation	None	\$500-\$7,000	Varies according to equipment use
El Camino Resources Ltd. (818) 895-6600 in Calif.; (800) 821-0229	Northridge, Calif.; Irvine, Calif. planned for fourth quarter	Yes	20	2,000	IBM AS/400, System/38; DEC in fourth quarter	IBM PCs, PS/2; Mac	50 dial-up lines	All associated peripherals for AS/400, System/38	100	First come, first serve	Full confidentiality of subscription base	Yes	Yes	Hardware replacement within five days; disaster recovery planning; Dealer & Lessor on used, new IBM, DEC equipment	\$1,500	\$250-\$600 monthly fee	No charge first 30 days
Fast Track Systems, Inc. (212) 422-9880	New York	Yes	1 1/2	2,000	DG computers	DG; IBM compatibles	60 dial-up lines, 2,200 four-wire full-duplex cables	Printers; disk, tape drives, communications equipment	No limit	Case by case	24-hour security, entry alarmed, closed-circuit TV, Halon-equipped bank-type vaults	Yes	Yes	Off-site storage, electronic vaulting, communications specialists, private nationwide phone network, equipment leasing	Determined by configuration	Determined by configuration	Determined by configuration
	Brooklyn, N.Y. (operational last quarter 1988)	Yes	1 1/2	7,000	DG computers	DG; IBM compatibles	120 dial-up lines, 4,400 four-wire full-duplex cables	Printers; disk, tape drives; communications equipment	No limit	Case by case	Same as above	Yes	Yes	Same as above	Determined by configuration	Determined by configuration	Determined by configuration
	Chicago	Yes	1 1/2	2,200	DG computers	DG; IBM compatibles	15 dial-up lines, 200 four-wire full-duplex cables	Printers; disk, tape drives; communications equipment	No limit	Case by case	Same as above	Yes	Yes	Same as above	Determined by configuration	Determined by configuration	Determined by configuration
Host Consulting Services, Inc. (203) 454-7610	(Eli) Boston	No	Two	5,500	IBM 4381, Prime 750	IBM	Three dial-up lines, coaxial, twisted-pair cables	ASCII protocol converter	Four/25	One per two square blocks in city, one per one square mile outside	Card access, general security procedures	Yes	Yes	None	None	\$750-\$4,000 per month	\$300
Hotsite (919) 460-1234	Cary, N.C.	Yes	Eight	28,000	IBM mainframes	IBM PC, PS/2	1,200 bit/sec. to T1	Disk, tape drives; impact, laser printers	100 per configuration/100+ per site	One per building	Camera surveillance, code locks, guards, tape vaults	Yes	Yes	PC-based planning services, relocatable shell	\$5,000-\$15,000	\$995-\$3,050	\$2,500-\$4,500
	Niles, Ohio	Yes	Eight	24,000	IBM mainframes	IBM PC, PS/2	1,200 bit/sec. to T1	Disk, tape drives; impact, laser printers	100 per configuration/100+ per site	One per building	Same as above	Yes	Yes	PC-based planning services, relocatable shell	\$5,000-\$15,000	\$995-\$3,050	\$2,500-\$4,500
	Tewksbury, Mass.	Yes	Eight	12,000	IBM mainframes	IBM PC, PS/2	1,200 bit/sec. to T1	Disk, tape drives; impact, laser printers	100 per configuration/100+ per site	One per building	Same as above	Yes	Yes	PC-based planning services, relocatable shell	\$5,000-\$15,000	\$995-\$3,050	\$2,500-\$4,500

COMPANY	SITE LOCATION	OFFERS COLD SITES	YEARS IN BUSINESS	SIZE OF SITE (SQ FT)	HOST COMPUTERS SUPPORTED	MICROS SUPPORTED	DATA, TELECOMMUNICATIONS FACILITIES	OTHER PERIPHERALS PROVIDED	SITE CAPACITY, NUMBER OF COMPANIES/PEOPLE	SELECTION PROCESS FOR CLIENT COMPANIES	SECURITY PROVISIONS	PROVISIONS FOR OFFLOADING TO OTHER SITES	SITE LIABILITY INSURANCE COVERAGE	ADDITIONAL SERVICES AVAILABLE	INITIATION FEE	RANGE OF SUBSCRIPTION FEE	RANGE OF PER DAY/USE CHARGES
IST Computer Services Co. (514) 383-1611	Montreal, Quebec	Yes	Three	3,000	IBM	Does not support micros, has IBM, Mac on site	T1, dial-up lines, modems, Rolm PBX	Disk, cassette, tape drives; impact, laser printers; communications controllers; punch card readers	60 per configuration/25 minimum	Case by case	24-hour security; access security through computers, card readers; closed-circuit TV	Yes	Yes	Consulting services, applications backup, disaster recovery education/training	None	Starts at \$1,500 per month	NP
LDI Disaster Recovery Corp. (216) 248-0991	Solon, Ohio; Cincinnati	Yes	Five	22,000 (Solon); 10,000 (Cincinnati)	IBM, Unisys (Burroughs)	All	600 data pair, 300 voice lines, Accunet reserve T1 lines	3,380 single-density DASD; tape drives; laser printers; check processing	100/Unlimited	One per building	24-hour monitoring; motion, smoke, heat detectors; secure access; fire alarms	Yes	Yes	Planning, consulting, technical support; emergency check processing	NP	NP	NP
Mobile Computer Recovery (609) 452-8080	Princeton, N.J.	No	Four	2,000	NCR	None	23 dual-dial backup lines, one 2,400 bit/sec. synchronous dial-up line	Disk, tape drives; printer; card, cassette reader	20/10	One every six miles or electrical substation	NP	No	Yes	None	Three-month subscription fee	\$2,000+	\$1,500 per day
NCR Corp. (513) 445-3836	Dayton, Ohio	No	Three	4,500	NCR V.I series	NP	150 AT&T dial-up lines, Accunet reserve T1 lines	Disk, tape drives; sorter; printers	50/20	NP	24-hour guard, electronic surveillance, badge readers	Yes	Yes	Disaster recovery planning, tape, disk, forms storage	None	\$5,000-\$150,000	Based on hardware configuration
Opticom Corp. (408) 281-6069	San Jose, Calif.; Kansas City, Mo.; Houston	No	Five	40,000	VAX, Cyber, Cray	IBM PCs, PS/2; Mac	Dial-up lines	Disk, tape drives; printers	20/100	One per 20-mile radius for dedicated service, five per a 20-mile radius for time-sharing	NP	Yes	Yes	Time-sharing, software development	\$2,500-\$10,000	Up to \$2,000 per month	\$10,000 per day or actual usage
Phoenix Services, Inc. (617) 862-8569	Lexington, Mass.	No	Five	NP	Prime	None	Eight dial-up lines	Tape, disk drives; printers	10/10	None	NP	No	NP	Time-sharing	NP	NP	NP
Recovery Management Services, Westbridge Computer Corp. (403) 234-9533	Saskatoon, Saskatchewan, Canada; Calgary, Alberta, Canada	No	Three	11,800 (Saskatoon); 5,500 (Calgary)	IBM, Unisys 1100	Depends on client requirements	29 lines	Disk, tape drives; printers	Varies by site	Determined by geographic area	Card access, security guards, will accommodate client	Yes	Yes	Contingency consulting, application dependency analysis	Varies	\$2,000-\$14,000	No additional charges for first eight weeks
Recovery Resources, Inc. (305) 422-5991	Orlando, Fla.	Yes	1½	13,000	Unisys	None	40 dial-up, three switched 56 kb lines; T1 multiplexers	Tape, disk drives; printers	30/40	Based on geographic area	Total monitoring	Yes	Yes	Time-sharing	\$1,000-\$2,000	\$2,000-\$8,000	Based on hardware configuration
Restore (716) 586-9510	Rochester, N.Y.	No	15 months	8,000	IBM, NAS	IBM	Up to 200 dial-up lines	IBM 3705, 3725, Xerox laser printer	72/80	Based on individual risk analysis	Card access	No	Yes	Risk analysis, disaster planning, data center relocation	\$10,000	\$1,000-\$5,000	\$1,000-\$5,000
Songard Recovery Services, Inc. (800) 523-4970	Philadelphia, Chicago, San Diego	Yes	10	45,000-100,000	IBM 3090, 3083, 3081, 4381; VAX 8800, VAX-11/785; Tandem VLX, TXF	None	9,000 cable pairs; 11 T1, two T3, 16 switched 56 kb lines; full array of dial backup lines	Laser printers, channel extenders (all associated IBM, DEC, Tandem peripherals)	110/200 (Phil.); 110/100 (Chicago); 110/65 (San Diego)	One per building	Card access, 24-hour security, closed-circuit TV	Yes	Yes	Contingency planning, electronic vaulting	\$10,000-\$25,000	\$1,500-\$15,000	\$2,000-\$13,000
Sygen Recovery Services, Inc. (516) 491-1100	Long Island, N.Y.; Jacksonville, Fla.	No	Two	10,000 (N.Y.); 2,000 (Fla.)	DG	IBM PC, PS/2	35 dial-up lines	Multiplexers, modems, terminals, printers	Three/25 (Fla.); 65 (N.Y.)	One per five-mile radius	NP	No	Yes	Disaster planning, electronic vaulting, emergency/overload processing	\$500-\$1,500	\$250-\$2,500 per month	\$500-\$1,500 per day
Systematics, Inc. (501) 223-5554	Little Rock, Ark.	Yes	Five	25,000	IBM 4300, System/36	IBM PC	IBM 3705/3725 communications controllers, 14 dial-up lines, switched 56 kb lines	Disk, tape drives; DASD, printers	120/NP	Systematics management, software clients; other financial institutions on selective basis	24-hour security, card access, closed-circuit TV	No	Yes	Planning services	\$10,000-\$25,000	\$1,000-\$4,000	Up to \$6,500 per day
Wang Information Services Corp. (617) 870-8819	Burlington, Mass.	No	Two	2,500	Wang VS	None	16 voice, 24 data lines; Wang PACK 25	Wang peripherals	Four/40	Information on location, class of present client base provided	24-hour guards, card access	Yes	Yes	Four-to-nine hour shipment of mobile/standby Wang systems	\$3,000-\$10,000	\$500-\$2,000 per month	\$800-\$1,750
Weyerhaeuser Information Systems, Recovery Services (800) 654-9347	Seattle	Yes	Three	400,000	IBM 3090, 3080, 4300, System/36; HP 3000; Honeywell Bull DPS 6, DPS 8; VAX-11/780, PDP-11/70	IBM	100+ dial-up circuits; T1.5, X.25 networks; Weyerhaeuser Data Network (X.25 and SNA); modems; multiplexers	DASD, tape storage devices; printer for IBM, Honeywell Bull, HP, DEC; IBM, Honeywell Bull card readers	Nine/100+	One customer per configuration per building; 48 customers total per configuration	Camera surveillance, restricted building/grounds access, electronic card access	No	Yes	Remote testing, business support, relocation assistance, recovery consulting	None	\$750-\$5,000 per month	\$1,750-\$5,000



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## Windows open to 80386 power High-octane Microvaxes roll

## Lack of unity endangers the promise of DAT

BY JAMES A. MARTIN  
CW STAFF

Although digital audio tape (DAT) is not available yet in the U.S. consumer marketplace, the new media is generating interest among computer data storage

DAT, or Data DAT (DDAT), as industry insiders call it, promises capacity of up to 1.2G bytes and storage rates of up to 10M byte/min. This represents an improvement over current standard quarter-inch tape cartridge systems with 150M-byte capacity and storage rates of 6M to

7M byte/min.

W. R. D. S. L. K. Bozman

## Storage Tech boosts solid-stateance:

BY JAMES CONNOLLY  
CW STAFF

LOUISVILLE, Colo. — Data Storage Corp. last week announced a new solid-state storage strategy.

## Codex reveals net management

## DB2 advantages require narrow selection

Development benefits over IMS seen

BY R. BARCOCK

bank's Ready To IMS Fast Path, a complex DB2 application.

## Wang takes Ethernet plunge

VS host links are first step on road

BY ELISABETH HORWITT  
CW STAFF

LOWELL, Mass. — Wang's new Ethernet-based VS host links are the first step on a road to user demand connectivity.

## NEC releases hard-disk Multispeed laptop

WOOD DALE, Ill. — A hard-disk drive of its Multispeed IBM-compatible laptop was released last week by NEC.

electroluminescent screen. No slots have

## SOFTWARE NOTES

## Broker workstation tools

can put the entire VS family on Ethernet." Wang's decision to implement growing support for 802.3 as an industry standard as well as user demand for cost-efficient connectivity between VS systems and other vendors' computers,

Software, Inc. in will provide software series of intelligent workstations to be produced by ADP Financial Services, Inc., a subsidiary of Automatic Data Inc. The work-

tions will be designed to replace quote machines with systems that can provide client information, portfolio analysis and modeling options.

Hewlett-Packard

## IBM slow to remedy DB2 security

INFORMATION SYSTEMS

Not only is development time compressed, but program modifications and testing are not

And IBM, Fujitsu

BY CLINTON W. CW STAFF

IRVING, N.J.

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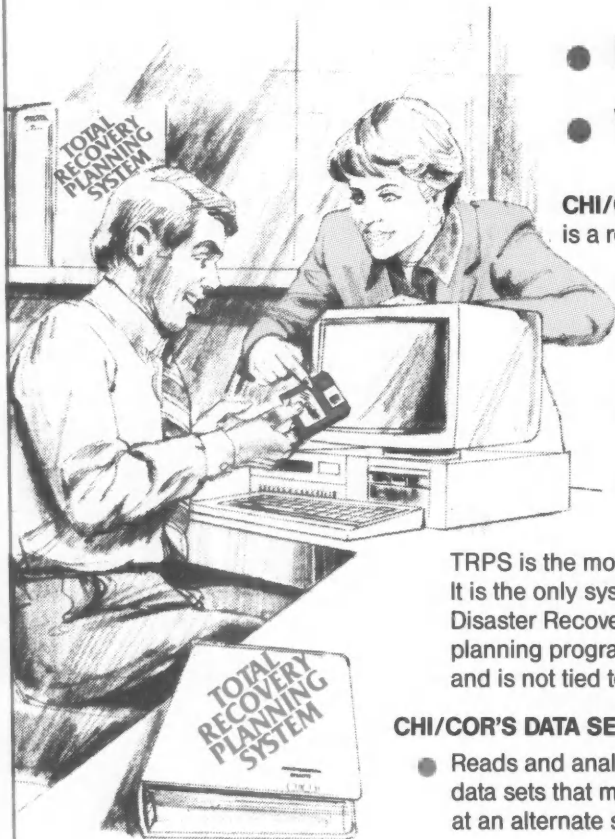
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# DISASTER RECOVERY PLANNING



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- Makes it easy to maintain your Disaster Recovery Plan as your environment changes

TRPS is the most advanced disaster recovery planning tool available. It is the only system that effectively addresses the issue of maintaining Disaster Recovery Plans for organization-wide or data center planning programs. TRPS is compatible with all recovery environments and is not tied to any single vendor's offering.

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- Reads and analyzes System Management Facility data to identify data sets that must be off site to successfully recover applications at an alternate site
- Interfaces with tape management systems to identify that the required data files are backed up and available at your off-site location.

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# MANAGEMENT

## TAKING CHARGE

Les Gilliam

### Facing the Fear Factor



Perhaps the greatest danger to the career of every information systems manager is the Executive Fear Factor. Executives are likely to be wary of anything they don't understand. They are especially cautious if their own careers and their companies' success are dependent on any one part of the organization or the person in charge of that function.

Such is the case in many companies today, where the availability of the on-line system is necessary to serve customers. Executives are very sensitive about customer service and satisfaction, since a customer lost is only rarely regained.

Some executives are very nervous about their vulnerability to a single person or a small group. If the executive fears that the loss of or dependence on a key player could jeopardize the company's future, he will try to allay that fear in some way. Organizational or personnel changes are often involved in such solutions.

Further, the executive may be saddled with a certain discomfort, knowing that if the computer system fails, he is at the mercy of someone else to find and fix the problem. Executives don't like to feel powerless.

The Fear Factor will be at its peak at four specific times: First, when the company decides to

*Continued on page 64*

## Charged-up DP shops embark on hiring spree

BY JAMES CONNOLLY  
CW STAFF

CLEVELAND — The end of several years of financial stagnation and the introduction of new technologies such as electronic data interchange (EDI) will fuel increased demand for data processing workers through the rest of this year, according to a personnel search firm.

"Companies that have been somewhat stagnant or even laying people off during the past couple of years are moving forward with a lot of bravado. This is probably one of the more dynamic times in the history of the data processing industry with respect to the number of people being hired to implement new systems," said Mark Blessing, director of Compusearch, the data processing division of Cleveland-based search firm

Management Recruiters, Inc.

Compusearch said 1987 had been a year of stabilization, while the first half of 1988 was a time of improvement.

Blessing cited the example of EDI as a technology that can drive the demand for new employees. As companies demand that their suppliers implement EDI, those suppliers must enhance or replace their computer systems if they wish to remain competitive.

Compusearch surveyed 376 companies of varying sizes in different industries and found that 37% plan to increase their staffs; 51.6% plan to maintain current staffing levels during the last six months of this year. Only 10.9% of the companies said they are planning to cut their MIS staffs in the second half of the year.

Firms specializing in DP, such as

*Continued on page 60*

## A graphics pioneer

Langridge's expertise shapes molecular models

BY J. A. SAVAGE  
CW STAFF

Most people would look out their grimy office windows and give only passing thought to air pollution. Not Robert Langridge.

When he moved into his 10th-floor office overlooking San Francisco's Golden Gate Bridge and the Pacific Ocean, Langridge scraped off some of the grime and put it on a glass slide. After examining its structure through a microscope, he concluded that it was not city pollution at all but sand blown in three miles from the beach.

When not inspecting window grime, Langridge runs a fanciful computer center dedicated to real-time, three-dimensional modeling of molecules on banks of graphics computers at the University of California at San Francisco Medical Center.

Instead of depending on a board of directors to provide money for his computer operations, Langridge appeals to the National Institutes of Health (NIH) and the National Science Foundation. Instead of maintaining computers to process financial data, he maintains systems and develops software to process enormous computations; these computations create dynamic models of proteins, which take on beautiful shapes and colors.

And instead of a DP staff, he employs 12 graduate students and staff and lets hundreds of visiting medical researchers from all over the world access the equipment.

The federal government funds the computer room in the university's Department of Pharmaceutical Chemistry to the tune of \$1 million to \$2 million a year. Currently, the de-

## PROFILE

Robert Langridge



**Position:** Director of the computer graphics laboratory at the University of California at San Francisco Medical Center.

**Mission:** To explore the strange new worlds of molecular modeling.

partment supports a Digital Equipment Corp. VAX 8650, two DEC VAX-11/750s running the University of California at Berkeley's Unix 4.3 and a Symbolics, Inc. 3600 LISP-based machine.

Graphics are supplied through an Evans & Sutherland Color Picture System 2 and Picture System 350. Graphics and raster displays are managed by two Silicon Graphics, Inc. Iris 2400Ts and an Evans & Sutherland PS390.

Langridge also uses a Convex Computer Corp. C1 minisupercomputer and 30 Sun Microsystems, Inc. workstations. For serious number-crunching, he says he borrows time on a Cray Research, Inc. Cray X-MP/48 located at the San Diego Supercomputer Center.

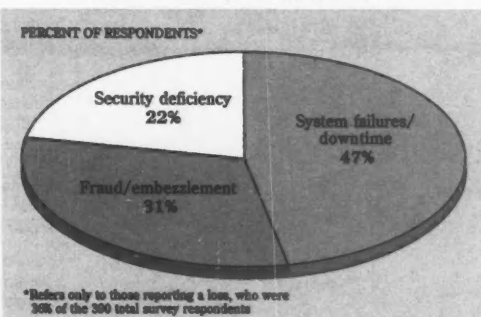
Office space is provided by the medical center, and the com-

*Continued on page 60*

## Data View

### Downtime hits bottom line

Data processing and data security professionals surveyed cite system failure as the leading cause of financial losses



INFORMATION PROVIDED BY ERNST & WHINNEY  
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## Pioneer

CONTINUED FROM PAGE 59

puter room quarters are anything but spacious. Three oscillating fans assist the air-conditioning.

A schematic outside the computer room maps the equipment for new students. And to help them remember which machine is which, they are all coded with names of philosophers. The Convex C1 is Plato, Socrates governs the VAX 8650 and Engels is the PS390.

In 1969, Langridge set up what he says was the nation's first computer graphics lab at Princeton University. The systems he used were a DEC PDP series minicomputer and the first Evans & Suth-

erland LDS1. In 1976, despite the opposition of his chemistry colleagues, Langridge employed Unix. He moved the lab to San Francisco in 1979.

It was in 1957, however, that Langridge started toying with computer graphics. As a graduate student working with Nobel prizewinner Morris Wilkins in 1955 at Wheatstone Physics Laboratory at Kings College in London, he developed his thesis on how protein molecules are structured.

"I was doing things with hand calculations for X-ray diffraction. It would take two weeks of hand calculations for one structure," he says. The illustrations in his thesis were also painstakingly drawn by hand.

In 1956, a colleague told him of an un-

used IBM 650 moldering in a warehouse north of London. After writing code numerically, since there was no assembler, Langridge was able to do two weeks' worth of calculations in half an hour. Unfortunately, there were only 2K-words worth of memory on a drum in the 650.

After setting up Project MAC, or Multiple Access Computer, at Harvard University in 1964, Bill Raub, director of the NIH Division of Resources, became aware of the computer work going on. And in the late 1960s, Langridge was asked to submit a proposal to the NIH to fund the use of computers in scientific research. "At that time it took a lot of vision," Langridge says. "The closest thing to computers employed in the academic community were teletypes, if anything."

Langridge and Princeton received \$750,000 — an enormous amount of money at the time — to set up the first scientific computer graphics center.

Langridge's use of computers still flies in the face of traditional academic research. "Older scientists don't think much of computer graphics; they think they're just pretty pictures. But it helps pull away barriers to understanding," he says.

### Still the underdog

And while Langridge's is among the oldest computer graphics projects of its kind, continued funding does not come easy. Like pitching a data processing project to a skeptical management board, Langridge must promote his projects to the federal government annually. This past year, Congress cut his budget 40% because his project happened to be in California and California could receive only 14% of the federal pie for such endeavors.

Langridge's primary assignment from the NIH is to develop software tools that allow scientists to manipulate molecules in real time, not through animation.

"It's a tool for understanding [how proteins and other molecules relate], not something that will design drugs for you," he says. However, many private pharmaceutical companies use software tools developed at Langridge's laboratory.

Langridge is working on developing software that is easy to use, but that takes some time. "Software development is not given a lot of credence in the academic world, although it is now easier," he says.

Langridge says he hopes that before the end of his career he can make a dent in discovering the way proteins fold, which would help people understand the way genetic engineering will affect living things. "We understand so few things about the living cell," he says.

Programming computers to emulate molecular structures gives Langridge a continued sense of wonder about the world. "You look at molecules on the screen — particularly in stereo — and suddenly you're inside them," he says. "Besides, it's a lot of fun."

## Charged-up

CONTINUED FROM PAGE 59

as service bureaus, showed the strongest hiring trends, as measured by the percentage of firms reporting planned staff increases — 62.9%. Other industries exceeding the national average of 37% included printing, agriculture, finance, retail trade, business services, mining and transportation.

Some of the industries falling below the 37% national average included construction, nondurable goods manufacturing, textiles, furniture manufacturing, machinery trade and medicine.

Geographically, some of the strongest areas for hiring are in the South Central states, while weaker growth is in the mountain states.

Blessing said the type of employee sought by companies has changed in recent years. Firms had sought specialists in IBM's DB2 and Cullinet Software, Inc.'s IDMS/R, he said. "Now they have loosened their specifications on particular hardware or software knowledge while at the same time tightening their specifications on things like business knowledge and business aptitude."



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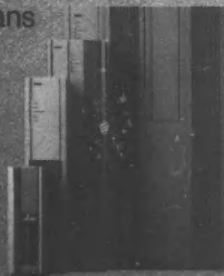
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## Gilliam

FROM PAGE 59

install its initial in-house system. The executive is faced with so many unknowns and uncertainties about the system and staff that it will contribute to heightened anxiety about the project and its risks.

Similarly, if the information

systems staff is installing the first on-line system to serve customers in real time, the executive will be careful in approving — and concerned in implementing — this critical system.

### When you're new

The other two critical points for the Executive Fear Factor happen when turnover occurs. If a new executive is appointed to

oversee the information systems function, he may step into that responsibility looking for some type of security blanket. He may even cancel or postpone plans or projects that were already approved by his predecessor.

Similarly, in the same situation, the new manager's lack of proven leadership and loyalty can raise doubts in the minds of

executives. They may establish a backup plan in case the new manager fails. For certain, executives will be hesitant to become overly dependent on the new manager until a trial period has passed.

What can the information systems manager do to minimize the Executive Fear Factor and thereby bolster his own career? Above all else, he must estab-

lish and maintain the Trust Factor. This refers to the executive's trust in the technology, the system, the information systems staff and the manager of that staff.

The information systems manager should take the initiative to eliminate or minimize the Executive Fear Factor and replace it with the Trust Factor. The Trust Factor is built on three major pillars: knowledge, performance and communication.

The starting point is to initi-

**WHAT CAN** the information systems manager do to minimize the Executive Fear Factor? He must establish and maintain the Trust Factor.

ate a face-to-face discussion with the executive to pinpoint concerns and then develop specific plans designed to address each concern.

Many times, the executive is suffering from a lack of knowledge about the technology and the systems being used. Vendor seminars are available to help build a technology knowledge base. Presentations and demonstrations can be used to inform the executive about the application systems. Users should be involved in the latter to support the importance and dependability of the systems.

Performance of the staff, the system and the manager should be self-explanatory. The problem lies in knowing the standard against which each of these is measured. Again, initiative on the part of the information systems manager may be required to set goals and measurement techniques and provide these for the executive.

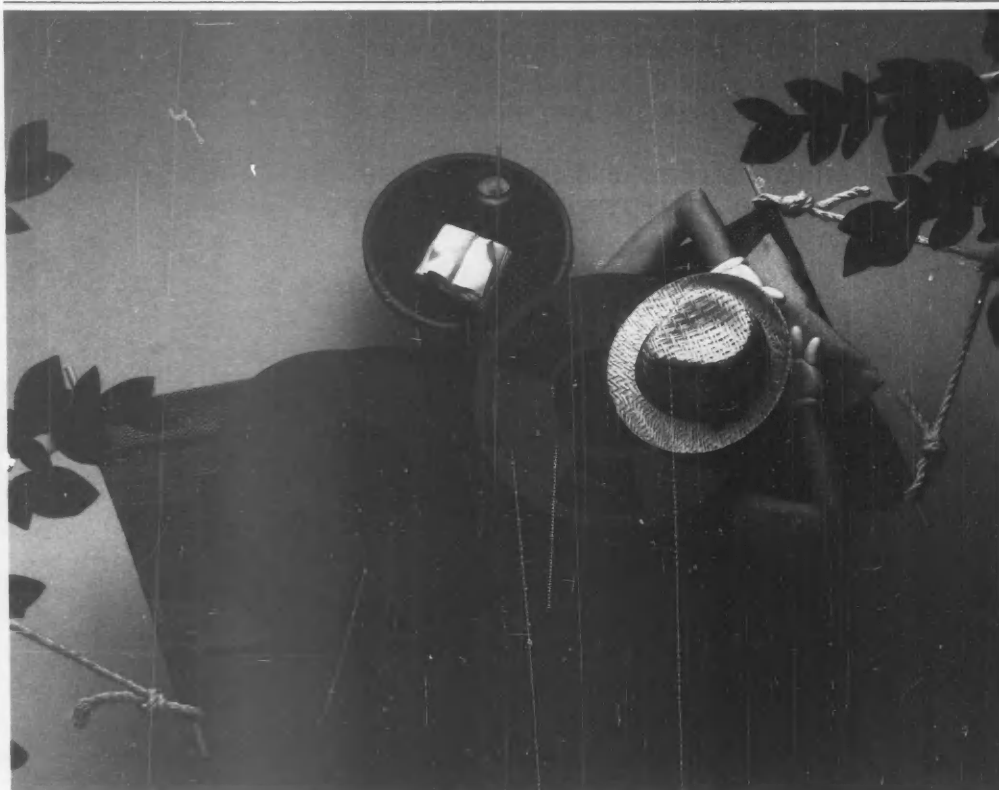
### Above all, talk

Of paramount importance is communication. If the executive is not kept informed, he may suspect the worst about information systems. Direct and regular communication about plans, successes and failures will help the situation.

If there are intermediate layers of management between the information systems manager and the executive, it is vital that the complete truth be passed up the ladder.

But communication should not be limited to the printed page. Face-to-face discussions are much more valuable. A frown may be worth a thousand words, but a smile is worth even more.

Gilliam is president of Gilliam Associates, a management and computer consulting firm based in Ponca City, Okla.

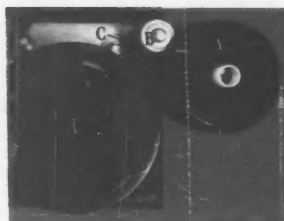


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## MANAGEMENT BRIEFS

# ACM taps Kocher as president, White as VP

The Association for Computing Machinery (ACM) recently elected Bryan S. Kocher, senior consultant at Consultants for Management Decisions in Boston, president for a two-year term.

Kocher, who previously served as Northeast regional representative on the ACM Council and chairman of the ACM Boston chapter, began his term July 1. He ran on a platform calling for action to set new directions for the association "to make ACM the preeminent computing society." He said his top priority is to establish distinguished panels to speak out on key issues such as the Strategic Defense Initiative, Section 1706 of the U.S. Tax Code and government funding for computer research.

John R. White, acting manager of the Xerox Palo Alto Research Center's Computer Science Laboratory, was elected ACM vice-president.

Sara A. Bly, a member of the research staff at the Xerox Palo Alto Research Center, was elected ACM secretary.

White has been chairman of the ACM Special Interest Group Board. Bly has been active in the ACM's Siggraph conference.

Information systems professionals in the insurance industry recently announced the formation of the Insurance Systems Management Association (ISMA). Membership in the management

category of ISMA is open to the leaders of the information services function, their immediate superiors and the front-line manager reporting to the MIS executive, according to executive director Ray Abi. Other information systems managers in the insurance field can join in a professional category.

Abi said the association's programs are directed at increasing the effectiveness of information systems and technology in the insurance and financial services industry. He said ISMA will sponsor an annual conference, roundtable meetings, an executive forum, a vendor forum, seminars,

a newsletter, software testing services and research studies.

Managers interested in joining should contact Ray Abi, ISMA, P.O. Box 446, New Canaan, Conn. 06840.

Several calls for papers have been issued for conferences to be held later this year and in 1989.

The International Association for Computer Operations Management issued a call for papers for its "Focus on Operations — IX" conference, which is scheduled to be held in San Diego Feb. 27-March 2, 1989. Papers or synopses may

be sent to the association at 742 E. Chapman Ave., Orange, Calif. 92666.

The Association of Human Resource Systems Professionals is soliciting workshop presentations for its annual conference, which will be held April 17-19, 1989, in Houston. Interested participants can contact the association at P.O. Box 8040-A202, Walnut Creek, Calif. 94596.

Papers are being accepted for the 1988 AEC Expo, which focuses on the automation needs of architects, engineers and construction professionals and will be held Dec. 6-8 in New York. Submissions may be sent by July 29 to Sandy Krueger, conference director, Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

## CALENDAR

### JULY 17-23

**Guide 71.** Chicago, July 17-22 — Contact: Guide International Corp., 111 E. Wacker Drive, Chicago, Ill. 60601.

**AM/FM International Executive Conference.** Snowmass, Colo., July 18-19 — Contact: AM/FM International, Suite 820, 8775 E. Orchard Road, Englewood, Colo. 80111.

**Optical Drive and Media Manufacturing Conference.** San Francisco, July 19-21 — Contact: Rothchild Consultants, 256 Laguna Honda Blvd., San Francisco, Calif. 94116.

**Parallel Programming: Experience with Applications Languages and Systems.** New Haven, Conn., July 19-21 — Contact: Judy Terrell, Yale University, Department of Computer Science, P.O. Box 2158, Yale Station, 51 Prospect St., New Haven, Conn. 06520.

**Computer Software: Protecting and Marketing Seminar.** New York, July 21-22 — Contact: Practising Law Institute, 810 7th Ave., New York, N.Y. 10019.

### JULY 21-30

**IEEE 1988 International Conference on Neural Networks.** San Diego, July 24-27 — Contact: Naomi Feldman, Conference Coordinator, 3770 Tenny St., San Diego, Calif. 92121.

**Navy Micro/OA '88 Conference.** San Diego, July 25-28 — Contact: Code 31.4, Nardac, San Diego, NAS North Island, Building 1482, San Diego, Calif. 92135.

**Summer Computer Simulation Conference.** Seattle, July 25-28 — Contact: Society for Computer Simulation, P.O. Box 17900, San Diego, Calif. 92117.

**National Systems Programmers Association Conference.** Milwaukee, July 27-28 — Contact: Napsa, P.O. Box 21525, Milwaukee, Wis. 53221.

**Optical Storage Solutions: Strategic Applications in the MIS Environment.** Colorado Springs, July 27-28 — Contact: The Yankee Group, Consulting Division, 200 Portland St., Boston, Mass. 02114.

**EDI Intertrands Conference.** San Francisco, July 28-29 — Contact: Input, 1280 Villa St., Mountain View, Calif. 94041.



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# COMPUTER INDUSTRY

## INDUSTRY INSIGHT

William Zachmann

### AS/400 no messiah



Myths die hard. The most recent evidence of this is the almost universal adoration with which IBM's most recent messiah has been received. Maybe it's got something to do with the approach of the third Christian millennium. Maybe it's the coming of the Age of Aquarius after all.

What I am talking about, of course, is the wave of apocalyptic enthusiasm with which IBM's new AS/400 mid-range processors have been heralded by the press and industry pooh-bahs. Lord have mercy! The days of trial and tribulation for the industry haven't even started yet, and everybody's looking for the messiah.

Nowhere was this more dramatic than on Wall Street. There, in the land of the sugar-plum fairy and the yum-yum tree — to say nothing of Ivan Boesky and Gordon Gekko — IBM shares suddenly, in anticipation of the blessed event, became worth more than they have at any time since the great crash of '87.

The question that keeps bothering me, however, is whether there is any there there. To be perfectly frank, I still haven't the foggiest idea what it is that everybody seems to be getting so excited about. IBM's AS/400 announcement seems to indicate little more than that IBM is likely to stay in the business of selling mid-

*Continued on page 70*

## Tandem CEO refocuses efforts

Treybig looks at big picture in wake of Ungermann-Bass purchase

BY J. A. SAVAGE  
CW STAFF

CUPERTINO, Calif. — James G. Treybig says he needs more time to think.

Tanned and relatively relaxed after returning from a month of ham radio operation in Aruba, Treybig, the chief executive officer of Tandem Computers, Inc., has disentangled himself from the day-to-day operations of the billion-dollar company. Getting free in last month's company reorganization was about the last thing he did before his vacation.

Treybig, who could be found in earlier days ruminating while reclined on a lawn chair in Tandem's front yard, has been feeling the pressure of a rapidly growing company. Tandem's acquisition of Ungermann-Bass, Inc. this spring added almost 1,000 new faces to Tandem's 7,000 employees.

"I need to be sure and con-



James G. Treybig

centrate on major problems and not little problems," he said. "As you get bigger, you have to work hard to keep things like creativity and innovation — all of the things that you lose [if you are run by] Harvard MBAs."

Treybig commented that one area of creative synergy between the technologies of Tandem and Ungermann-Bass is the concept of a fault-tolerant local-

area network.

"LANs aren't designed for power failure," he said. "So if the power fails in a building, everyone has to redo the LANs. If power fails in a building our computer is in, it just shuts off and comes back. It would be worthwhile for Ralph [Ungermann] and I to do that, but to do that I need time."

In addition to fault-tolerant LANs, Treybig said, Tandem is developing a Unix-based system and a new system that will be more than 100% more powerful than the current high end of the company's product line.

#### Blank sheet

Tandem, which was built on on-line transaction processing, is attacking the inherent problem of Unix time-sharing by developing a system from scratch, although it is using AT&T's Unix System V source code.

*Continued on page 68*

## Cherney rejoins ex-CMIers

BY CLINTON WILDER  
CW STAFF

BLOOMFIELD HILLS, Mich. — One year after losing a bitter battle for ownership of CMI Corp., Edward Cherney returned to the computer leasing industry last week to head the firm founded by former CMI executives.

Cherney joined Encore International, Inc. as president and chairman. Encore International was founded last year by several executives who had worked for Cherney at CMI [CW, Sept. 14, 1987] but left after rival lessor Continental Information Systems Corp. (CIS) won a court decision allowing it to buy CMI for \$50 million [CW, July 27, 1987]. Both CMI and Encore Interna-

*Continued on page 70*

## Data View

### Changing tides

In the last decade, Japanese firms have taken over most of the top 10 spots among merchant semiconductor manufacturers

Rank*	1977	1987
1	Texas Instruments	NEC
2	Fairchild Semiconductor	Toshiba
3	Philips	Hitachi
4	National Semiconductor	Motorola
5	Intel	Texas Instruments
6	Motorola	Fujitsu
7	NEC	Philips
8	General Instrument	Intel
9	RCA	Mitsubishi
10	Rockwell	Matsushita

\* Based on number of units sold

INFORMATION PROVIDED BY COMPUTER TECHNOLOGY RESEARCH CORP. CW CHART

## Buy-out spices up VM market

BY NELL MARGOLIS  
CW STAFF

For the past several years, IBM's VM operating system utilities market has been a specialized yet sleepy niche, mined successfully by Reston, Va.-based VM Software, Inc. and a few lesser known players. But in 1988, the market has heated up quickly.

"Until recently, VM was the Rodney Dangerfield operating system; it got no respect," said

Bruce Mancinelli, vice-president of marketing at VM Systems Group, Inc. Arlington, Va.-based VM Systems late last month vaulted into the No. 2 spot in the market by acquiring Kolinar Corp. in Santa Clara, Calif., for an undisclosed amount.

What is causing the VM market to change, Mancinelli said, is a series of supportive signals from IBM.

"The inclusion of VM under *Continued on page 72*

#### inside

- Bell Atlantic Systems Leasing acquires Data 3 Computer. Page 68.
- IBM Europe defends applications development effort. Page 69.

## National Semi financials disappoint

BY JAMES DALY  
CW STAFF

SANTA CLARA, Calif. — Although the pulse has returned to National Semiconductor Corp.'s once-gasping semiconductor business, the company still cannot completely spring to life and recently reported financial results that were well below analysts' expectations.

National Semiconductor's quarterly and yearly figures were often significantly better

than those from the comparable period last year. But difficulty in its National Advanced Systems unit and Information Systems Group tempered any industry enthusiasm and sent the company's stock skidding [CW, July 4].

"National Semiconductor can't seem to get out of its own way," said Andrew Kessler, a securities analyst at Paine Webber, Inc. "In the semiconductor recession, they lost all sorts of money, and what saved the day was their computer business.

Now it's just the opposite."

Others blamed pressure from the strong Japanese yen for taking a bite out of the mainframe business just as positive results from last year's acquisition of Fairchild Semiconductor Corp. were building up.

"The strong yen definitely exacerbated the slippage and severely hurt their business," said Michael Gumport, a senior electronics analyst at Drexel Burnham Lambert, Inc.

For the quarter ended May

29, National Semiconductor reported revenue of \$682.9 million, a 33% increase over the \$511.9 million reported for the same period a year earlier.

Quarterly net income jumped 167% to \$22.4 million, or 18 cents per share, from \$8.4 million, or 6 cents per share, reported for the same quarter a year ago. But analysts had expected earnings per share to be more in the neighborhood of 20 to 25 cents.

Revenue for fiscal 1988 was reported at \$2.46 billion, a 32% increase over the \$1.86 billion reported the year before. The

company also reported net earnings of \$62.7 million, or 48 cents per share, compared with a net loss of \$23.4 million, or 36 cents per share, a year earlier.

Results for fiscal 1988 included eight months of the sales and operating performance of Fairchild.

The firm also noted that implementation of the Financial Accounting Standards Board's No. 96 accounting change resulted in an increase in net earnings of \$2.3 million, or 2 cents per share, in fiscal 1988. Quarterly results were not affected by the change.



## Treybig

CONTINUED FROM PAGE 67

"We're using Unix System V and building unique hardware and adding software," he said.

Treybig was mum on details of the new high-end machine, but said it will be air-cooled and will have lower temperatures than current models. He said Tandem could build computers twice as powerful as what is currently offered without adding plumbing.

As for some of the company's internal problems, Treybig said that they may flare up but are manageable.

Treybig did not comment on rumors of takeover interest by Unisys Corp. last

**I** NEED TO BE sure and concentrate on major problems and not little problems. As you get bigger, you have to work hard to keep things like creativity and innovation."

JAMES G. TREYBIG  
TANDEM COMPUTERS, INC.

month, but did say "we don't have any interest in being acquired by anybody."


While Treybig was vacationing in Aruba, the company approved a takeover defense measure. It increased its per-share exercise price by 50% and enabled the board of directors to delay the exercise date, effectively pricing the company out of the takeover market, according to

Montgomery Securities analyst John Jones.

Jones said the new exercise price "puts Tandem at a cap of \$12 billion, twice the current market cap of [rumored Unisys takeover target] NCR Corp., and NCR generates revenues of about five times what Tandem generates. The dowry is too expensive to entertain a marriage."

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## INDUSTRY WEEK IN BRIEF

**Bell Atlantic Systems Leasing** has acquired Data 3 Computer Corp., a privately held computer equipment vendor based in Minneapolis, for an undisclosed amount. Data 3 primarily sells mid-range computer products to secondary marketing firms.

**Compaq Computer Corp.** has inked an agreement with San Jose, Calif.-based Valid Logic Systems, Inc. to use Valid Logic's integrated electronic design automation software to design application-specific integrated circuits for upcoming Compaq products. Valid Logic will port its design and validation tools to Compaq 386 personal computers for internal use at Compaq's design facilities in Houston.

Twenty-year IBM veteran H. L. "Sparky" Sparks was named vice-president of sales and marketing at San Jose, Calif.-based workstation maker Nexgen Microsystems. Sparks, who helped launch the IBM Personal Computer into dealer sales and service channels, has done marketing stints at several other companies, including Compaq, Tandem Corp. and Amdek Corp.

**SHL Systemhouse, Inc.'s** U.S. subsidiary, Arlington, Va.-based Systemhouse, Inc., has purchased the systems conversion business of Rand Information Systems, Inc. for \$1.5 million in cash plus an additional maximum of \$1.25 million payable as the Rand technology is applied to new contracts. The newly purchased personnel and technical capacity will form a business center within Systemhouse's San Francisco branch.

**On Technology, Inc.,** the Cambridge, Mass.-based offspring of Lotus Development Corp. founder Mitch Kapor, has announced a "substantial" investment from The Cole Gilburne Fund, a venture capital group. On Technology was formed last November and is currently designing a new development platform for software developers.

Financial data processing and application software provider Systematics, Inc. recently announced healthy financial growth for the quarter and fiscal year ended May 31. Quarterly revenue for the Little Rock, Ark., firm was up 28% more than a year earlier to \$49 million, while net income jumped 76% to \$4.1 million, or 36 cents a share. Yearly revenue increased 27% from last year to \$179.5 million.

Canadian telecommunications giant Mitel Corp. last week terminated its proposed deal to buy General Electric Co.'s RCA telephone systems business. The companies mutually announced that they were unable to agree on terms.



# IBM Europe chief defends strategy

BY AMIEL KORNEL  
IDG NEWS SERVICE

PARIS — Seeking to deflect criticism that IBM's activities in applications software development and systems integration represent pernicious competition for software and services firms, IBM Europe's top executive praised the firm's Business Partners program at a conference here last month.

C. Michael Armstrong, president and directeur general of IBM Europe, said the program has resulted in partnerships with 2,400 agent companies throughout Europe, the Middle East and Africa dealing with the System/36 and 38 and 9370, and with 2,000 IBM Personal Computer dealers in Europe.

Addressing the Sixth World Computing Services Industry Congress, Armstrong defended the company's growing applications development effort. "There is much more demand than any of us can satisfy," he said. "It's a market of specialization that no one firm will accommodate."

To support his argument, Armstrong cited figures indicating that no single supplier has more than 5% of the European applications software and services markets, both of which are growing more than 20% annually.

## Getting a slice

Armstrong also argued that although IBM provides its own applications software and services for its System/36 and 38 mid-range family, computer services companies continue to supply about 80% of the software and services for that market.

Internally, IBM has poured more than 600 people into its recently created systems integration activities in Europe, and more than 800 others work in product development centers writing applications software to meet specific client needs.

IBM's push into systems integration has nonetheless spawned a number of short-term alliances in Europe. It readily forms partnerships with local companies that can offer specific expertise.

## Changes afoot

"There is a will to adapt to the new rules of the game," said Jean-Pierre Coffinet, a researcher at the Paris office of management consultants Booz, Allen & Hamilton, Inc. "The business of IBM is going to change in coming years as it sells more complex systems with terminals of all kinds."

Other presentations at the congress treated such subjects as growth in demand for value-added network services and systems integration, consolidation

in the marketplace and trade restrictions.

Anthony Craig, president of General Electric Co.'s Information Systems unit, denounced protectionist regulations and commercial restrictions in Europe that continue to "suffocate" economic vitality. He ap-

plauded European Community moves to remove those trade barriers and create a common economic market by 1992.

In the conference's keynote speech, Valéry Giscard d'Estaing, former president of France, warned participants to prepare for the opening of Eu-

rope's economic frontiers.

"You and the managers you assist will have to take into account a new European market from 1992 on," Giscard d'Estaing said. "In your business, it is essential for you to teach your customers how to adapt to this market, which is at one and the same time more homogeneous and more complex."

According to Peter Cunning-

ham, president of Mountain View, Calif.-based market researcher Input, European spending on information services will grow to \$75.9 billion by 1992 from \$31 billion in 1987. The U.S. market, he predicted, will grow to \$142.4 billion from \$65.5 billion in 1987.

Jenny de Montaigne, a reporter with *Le Monde Informatique*, contributed to this report.

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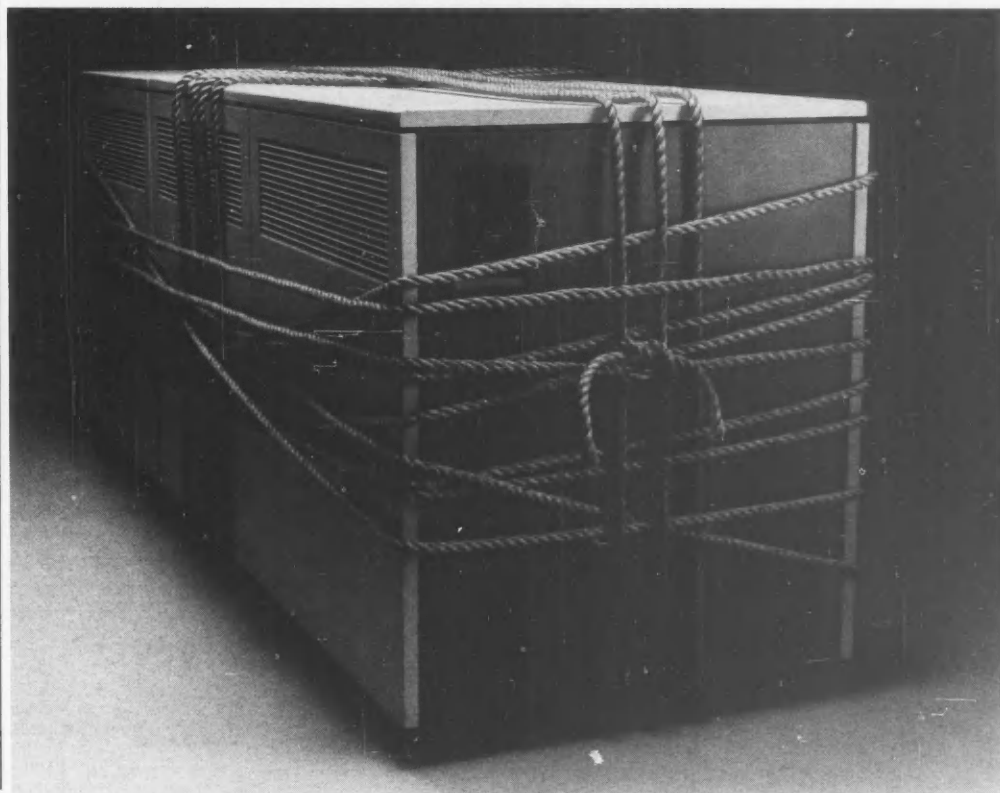
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## Zachmann

CONTINUED FROM PAGE 67

range systems to small and medium-size companies. But I can't, for the life of me, see why it should mean that IBM is going to do any better in the near term.

### Leaks flooded market

In the first place, Silverlake (er, I mean the AS/400) had been so thoroughly leaked and therefore anticipated by everybody that it is hard to see why the actual rollout should change anything at all. IBM's customers — and competitors — have known for some time what was coming.

Second, even if we don't quibble with

IBM's own somewhat esoteric benchmarks, a 30% improvement in price/performance hardly creates a radically different competitive environment. It is no more than par for the course as far as new IBM proprietary architecture systems go. It doesn't even pose a major competitive threat to traditional higher priced minicomputer vendors like DEC, let alone more aggressively priced micro-based systems from vendors like Sequent.

Third, the AS/400 announcement effectively confirms what has already been apparent for some time to those who cared to look: IBM has just about completely abandoned its early efforts to create a three-tier system strategy for large organizations. The AS/400 is miles away from being an effective departmen-

tal processor for large organizations. It remains true to its roots in the System/36 and 38 line as a primary system for small and medium-size businesses.

All of which means that the reality behind IBM's Systems Application Architecture (SAA) supposedly unifying the Personal System/2, System/36 and 38, 370, 3090 and 9370 architectures is quite different from its superficial appearance.

SAA doesn't represent the unification of three architectures into a three-tier processor strategy at all. Instead, it adds up to a two-tier strategy in which the top tier, in large organizations, is meant to be the 3090 and, in medium-size and small organizations, the AS/400.

IBM's response to DEC's penetration

into departments of larger organizations with VAX VMS systems, in other words, is simply to convince users to treat PS/2s as, in effect, "super-smart" terminals connected to 3090 host systems running IBM's MVS/ESA. IBM is following what amounts to a regressive circle-the-wagons-round-the-mainframe strategy, returning the AS/400 to the small-business roots of the original System/3 of the early 1970s.

### Spend more, get less

The result is a system that is much too expensive and far too clumsy to be taken seriously as a real departmental system for larger organizations. Compared with microprocessor-based offerings even of traditional vendors — like the NCR Tower or the Prime EXL 316 — the AS/400 looks like a terrific way to spend more while getting less.

IBM's problem, however, is that a system that really doesn't cut the mustard as a departmental system for big organizations doesn't offer a highly competitive alternative to medium- or small-scale businesses either.

The high-end AS/400 will certainly sell well enough to current users of the System/38 who have run out of capacity. But it isn't at all likely to provide the major momentum into new accounts that IBM is hoping for. Neither is it likely to provide the rapid boost to IBM earnings that Wall Street prematurely celebrated in anticipation of and immediately following the announcement of the AS/400 line.

Zachmann is vice-president of research at International Data Corp.

## Cherney

CONTINUED FROM PAGE 67

tional are based here.

The combination of Syracuse, N.Y.-based CIS and CMI merged the independent leasing industry's No. 2 and No. 3 players behind leader Comdisco, Inc., creating a potent new force in the hotly competitive business. But former CMI executives, led by former Senior Vice-President of Marketing Lloyd B. Marks, wasted little time in forming Encore International to challenge CIS and other firms for CMI's leasing customers.

### Moral supporter

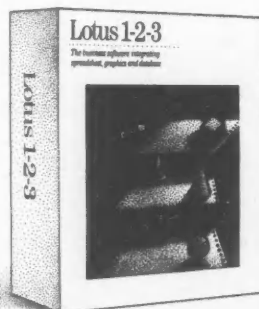
Cherney, who led the lawsuit to block the CIS takeover but was defeated, was prohibited from competing against CMI until May 31 of this year. But leasing industry observers considered him the moral supporter of Encore International, whose management team, location and name suggested a "new CMI" to compete with the old one.

In a prepared statement last week, Cherney said, "I have evaluated a number of opportunities and decided to stay in Bloomfield Hills and join Encore."

With Cherney's arrival, Marks assumed the No. 2 position at Encore International as chief operating officer and executive vice-president. Encore International Executive Vice-Presidents Frank Chartier and Gary Smith and Chief Financial Officer Dennis Grice, all former CMI executives, will continue in their current positions.

Encore International employs about 100 people and has a leasing portfolio valued at approximately \$300 million.

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## VM market

CONTINUED FROM PAGE 67

Systems Application Architecture, the promotion of the 9370, the inclusion of full VTAM and CICS support, the opportunity for XA exploitation under VM/XA — all these things that MVS users take for granted are now coming to VM users," Mancinelli said.

VM, he noted, "is growing at a strong and steady rate in the mainframe operating environment. Many companies are adding it as part of their overall offerings. And there is a small handful of dedicated software companies that want to become a serious alternative."

While agreeing that VM is undergoing

a shift from Dangerfield to greener fields, market analysts were not in accord as to whether a trend toward consolidation is afoot.

### Trend setters

"I definitely see trends both toward consolidation and toward expansion," said Timothy McCollum, an analyst at Dean Witter Reynolds, Inc. "MIS managers are more comfortable buying from larger companies, and the companies themselves are well aware of that. It's hard to get market presence when you're small."

McCollum said he expects to see dedicated VM companies either banding together, as have VM Systems and Kolinar, or dropping the "dedicated" term, as did market leader VM Software. VM Soft-

were recently acquired a networking software subsidiary, Systems Center, Inc. [CW, May 30], and is rumored to be contemplating an appropriate buy into the Digital Equipment Corp. software market.

On the other hand, "the software industry as a whole is periodically subject to consolidation," noted Kenneth Burke, an analyst at Alex Brown & Sons, Inc. in Baltimore. "I see no special trend in the VM segment." The dynamics of the VM market, Burke said, "have been confused by the lack of success, so far, of the IBM 9370. All that noise has obscured the reality, which is that VM is clearly important to IBM."

VM Systems will fold Kolinar's respected line of end user-oriented VM soft-

ware into VM Systems' VM utilities and distribute both through VM Systems' marketing and sales organization.

"This looks like a smart move on both companies' parts," said Melinda Varian, a systems programmer at Princeton University, which runs five VM systems. "We were really pleased to hear about it; the combination should prove to be a major force in the marketplace."

VM Systems, which acquired several key Kolinar executives, including President Jim Bergsten, certainly intends that to be the case.

"Right now, the VM market tends to be VM Software and Everybody Else," VM Systems' Mancinelli said. "By virtue of [the Kolinar acquisition], we come out the undisputed, undebatable No. 2."

## NICKELS & DIMES

**Measurex Corp.** announced net income for the second quarter ended May 29 of \$8.9 million, or 47 cents per share, compared with net income of \$6 million, or 31 cents per share, reported in the like period a year ago. Revenue for the quarter was \$65.8 million, compared with \$57.6 million reported last year.

**The Ultimate Corp.** announced revenue for the year ended April 30 of \$209.2 million, compared with \$171.1 million in the previous year. Profits were \$13 million, or \$1.32 per share, compared with \$13.8 million, or \$1.43 per share, in the corresponding period a year ago.

Revenue for the fourth quarter was \$59.2 million, compared with \$50.7 million in the previous year. Net income for the fiscal 1988 fourth quarter was approximately \$10,000. Net income for the fourth quarter of fiscal 1987 was \$4.4 million, while per-share earnings were 45 cents.

**Floating Point Systems, Inc.** announced revenue for the second quarter ended April 30 of \$17.7 million, compared with \$19.2 million in the previous year. The company reported a net loss of \$7.3 million, or 82 cents per share, compared with a net loss of \$5.7 million, or 65 cents per share, one year ago.

**Micron Technology, Inc.** announced revenue for the third quarter ended June 2 of \$85.6 million and net income of \$29.3 million, or \$1.01 per share, compared with revenue of \$22.8 million, and a net loss of \$3.7 million, or 14 cents per share, for the third quarter last year.

**Adobe Systems, Inc.** announced revenue for the second quarter ended May 31 of \$18.8 million, compared with \$9.6 million last year. Adobe reported profits of \$4.5 million, or 42 cents per share, compared with \$2.3 million, or 22 cents per share, a year ago.

**American Software, Inc.** reported revenue for the year ended April 30 of \$54.2 million, compared with \$46.7 million last year. Profits were \$10.3 million, or \$1 per share, compared with \$8.8 million, or 85 cents per share, in the like period a year ago.

In the fourth quarter, revenue was \$14.3 million, compared with \$12.8 million last year. Profits were \$2.7 million, or 26 cents per share, compared with \$2.1 million, or 20 cents per share, in the like period a year ago.



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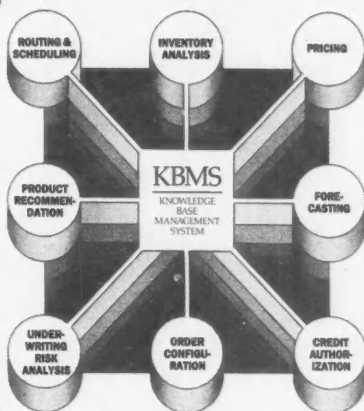
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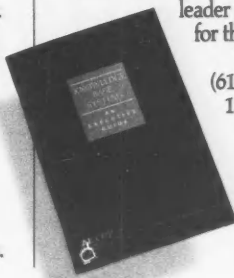
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# COMPUTER CAREERS

## Contingency planners in demand

*Diplomacy, even evangelism, sought in disaster recovery specialists*

BY JANET MASON  
SPECIAL TO CW



The spate of floods, fires and earthquakes in the past several years — and the ensuing business catastrophes — have planted contingency planning positions firmly on the map in many corporations.

The natural disasters have underscored the dependence of corporations on their data centers. In addition to firms legally required to have contingency plans, others are grasping the fact that they cannot survive without backup facilities.

Cameron Carey, president of Computer Security Placement Corp. in Northboro, Mass., says he saw little concern and few opportunities in the area until two years ago. Since then, however, the number of jobs in the field has grown threefold, he says.

### Full-time responsibility

Contingency planning has often been a part-time responsibility, with data security a frequent companion. But in many places, it is becoming a full-time occupation. "Companies are realizing that there is a lot to disaster recovery and that it is not a part-time job," says Jack Bannan, an

information security manager at General Electric Co. and president of the Delaware Valley Disaster Recovery Information Exchange Group.

According to Carey, salaries for lower level positions, such as a contingency planning analyst,

insurance industries.

For the most part, those moving into contingency planning are seasoned DP professionals with wide experience. Most learned something about contingency planning while working on related projects.

**T**HE CONTINGENCY PLANNER has to be less a technician and more a "human communicator and diplomat who is able to sell the program and think his or her way through corporate policies."

CAMERON CAREY  
COMPUTER SECURITY PLACEMENT CORP.

average about \$38,000 in the Northeast. For contingency planners salaries average about \$48,000, he says. The pay scale for the top position of information integrity officer varies widely depending on the industry. Carey says the salary at a bank would average \$60,000, while it might be twice that at a Wall Street brokerage firm.

Because of federal regulations, there are more contingency planning opportunities where there is a high concentration of financial institutions and government contractors, Carey says. But opportunities are also spreading in the airline and in-

Bannan, a DP veteran for more than 25 years, says the contingency planner does not need "a machine-specific background." Disaster recovery, he says, "is more general, involving a lot of common sense that is transparent to the system."

But Bannan emphasizes that technical knowledge of the data center is essential. He adds that those in contingency planning do not have to know programming but that the technical knowledge will help former programmers.

When Carey scouts for a prospective candidate, he looks for interpersonal skills and strong written and verbal communica-

tions. These attributes are necessary to coordinate the various groups of people involved in contingency planning.

Ultimately, Carey says, the contingency planner has to be less a technician and more a "human communicator and diplomat who is able to sell the program and think his or her way through corporate policies."

Chuck Pachinger, senior data security analyst at National City Bank in Cleveland, explains that a substantial part of his job involves educating top management about the importance of disaster recovery. He enjoys the contact with different groups of people, but says, "I can't say it's always rewarding."

Because of the large number of people involved, there are no speedy results, Pachinger explains. "It is a long, drawn-out and cumbersome process." But

Pachinger says he finds it interesting to work with groups outside MIS and satisfying once the process is completed.

Another contingency planner, Judith Hinds at Chemical Bank in New York, says she finds this contact with myriad groups one of the most interesting parts of her job. Hinds, an assistant treasurer in the bank's disaster recovery services unit, says she and her colleagues coordinate contingency planning work among various departments.

GE's Bannan says contingency planners must be "absolutely evangelical" about disaster recovery. "In many instances, the person will have to convince management and the other people involved that it is an important function," he says.

Mason is a Philadelphia-based freelance journalist.

## Summertime blues?

Summer can be a hot time for job hunting, according to Jack Erdlin, president of Management Dimensions, Inc., a placement and career consulting firm in Wellesley, Mass.

First, Erdlin says, a lot of people view the summer as a bad time to job hunt; furthermore, many are vacationing then, so there is less competition. In addition, the following must be considered:

- At numerous companies, July 1 ushers in the new fiscal year, bringing with it money for new hires.
- Summer slowdowns provide time to discuss jobs or transfers with prospective bosses.
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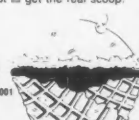
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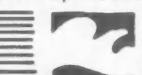


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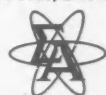
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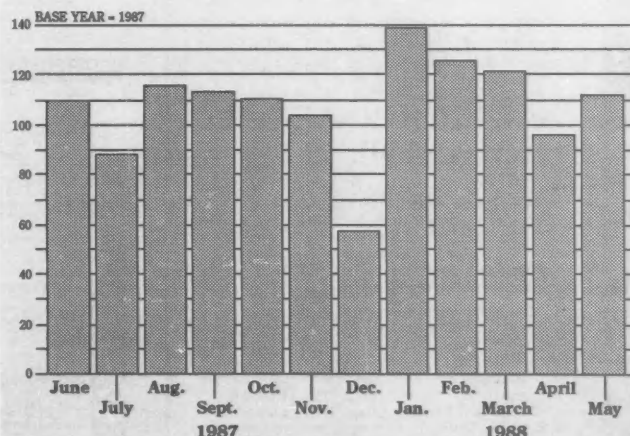
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## CAREER INDEX

### Computer recruitment advertising index\*



\*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

INFORMATION PROVIDED BY CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE

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# MARKETPLACE

## Cost-conscious firms buy used

Budget constraints up demand; cutbacks in supply enlarge used market

BY DAVID A. LUDLUM  
CW STAFF

With saving money traditionally the chief concern of companies pondering the purchase of a used central processor, a growing number of firms are said to be opting to buy used equipment in the face of corporate cost controls.

"Budget cuts within companies at the corporate level have affected the used market tremendously," says Ray C. Davis, executive director of the National Association of Computer Dealers (NACD), which is based in Houston.

The used computer market grew to \$4.8 billion in 1987 from \$4.2 billion the previous year, according to studies by the NACD, and Davis says those numbers understate the growth in unit volume because prices have maintained their customary downward course.

### Cost-conscious

At Allied-Signal, Inc.'s Allied Aftermarket division, a maker of automobile parts in Providence, R.I., the selection of a used computer illustrates traditional cost control considerations.

The division, which is content

to position its technology behind the leading edge and projects a two-year need for the processor, will install a used IBM 3081 mainframe, according to William Farnham, manager of MIS technology. "The biggest reason we're going to put in a 3081 versus a 3090 is price," Farnham explains. "We priced a 3090 Model 180 at about \$1.7 million. The 3081 KK was about \$500,000 a few months ago, and I understand the price has since dropped."

The 3081 runs at a speed of 15 million instructions per second (MIPS) while, according to IBM, a 3090 Model 180E would be only slightly faster at 17.6 MIPS, Farnham says.

"And the reliability is there — the boxes have run well," he says of IBM's 3081. "The KXs have a good name in the marketplace. They work well for a long time."

But, "there are two ways to skin a cat," says George DiNardo, executive vice-president of information management and research at Mellon Bank Corp. in Pittsburgh. DiNardo says that with the double-digit growth of the bank's processing business, he has no use for used processors. "I buy the early new model as soon as it is available," he

says, contending the approach has allowed him to cut the cost of users' work 10% a year for 15 years.

New processors offer 50% more power than their predecessors for roughly the same price and support costs, including personnel, according to DiNardo.

**B**UDGET CUTS within companies at the corporate level have affected the used market tremendously.

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When fully depreciated after five years, they might fetch \$500,000, he says.

"For us, it simply pays to buy the newest," DiNardo says, because of the price/performance gains and "because we're simply unafraid to take the latest technology."

One reason the prices of used computers continue to decline in the face of firm demand is a glut of equipment on the market, according to the NACD's Davis. That demand is due in part to the introduction of products but also to the trend of corporate cutbacks and restructuring, which

prompt failing organizations to unload equipment, he says.

"Banks are finding themselves in a brokering position. They start dumping them on the used computer dealers at a low cost to the dealers," he says.

But the used computer market also reflects the downward spiral of prices for new hardware. A new AT&T 3B2, for example, now sells for less than a used one did two years ago, according to Davis. The discontinued 3B2 300 is still available new

probably the largest concern offsetting the attractions — the low prices and, in some cases, quicker delivery.

Federal government agencies require that the used processors they buy are eligible for maintenance by the vendor, according to Whit Dodson, vice-president of research at market research firm International Data Corp. in Washington, D.C.

"That means it had to be inspected by the original equipment manufacturer and certified," Dodson says. With the certification, a used processor is generally as reliable as a new one of the same make and model, although it would tend to be less reliable than a more recent product, he says.

Federal government budget constraints have probably not altered the government's policy with regard to buying new or used processors, according to Dodson.

"There's a big bugaboo that the government inventory is obsolete," he says, and for a new system, agencies would rarely permit the purchase of a used processor for fear the machine would become obsolete during the typical four- to 12-year life of a system.

"Where they would be interested is where they have installed equipment and need some more," Dodson says.

Ludlum is a *Computerworld* senior writer.

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	Closing price	Recent high	Recent low
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XT Model 086	\$1,100	\$1,100	\$875
XT Model 089	\$1,450	\$1,650	\$1,150
AT Model 099	\$2,100	\$2,350	\$1,800
AT Model 239	\$2,600	\$2,750	\$2,125
AT Model 339	\$3,200	\$3,450	\$2,600
PS/2 Model 30	\$1,525	\$1,650	\$800
PS/2 Model 50	\$2,275	\$2,375	\$1,900
Compaq Portable I	\$750	\$900	\$575
Portable II	\$2,275	\$2,375	\$1,650
Portable III	\$2,950	\$3,000	\$2,700
Portable 286	\$2,250	\$2,350	\$1,675
Plus	\$1,000	\$1,100	\$900
Deskpro 20-MHz	\$1,250	\$1,450	\$975
Deskpro 286	\$2,375	\$2,475	\$1,800
Deskpro 386	\$5,050	\$5,100	\$4,600
Apple Macintosh 512	\$675	\$750	\$575
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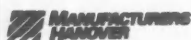
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—Crista Martyr  
Senior VP/General Manager  
Leasametric Data Communications



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With so much going on in one place, it's no surprise that Senior Vice President/General Manager Crista Martyr has a lot to think about. Not the least of which is advertising.

"We're out to reach a broad base of customers in Fortune 1000 businesses. Over the last year we set out to position the company as a long-established survivor — and

the perfect choice for one-stop shopping.

"If we want to effectively promote ourselves as being all things to MIS/DP and communications professionals, we need a vehicle that takes the same approach. That's why we advertise in Computerworld.

"Computerworld is read by MIS managers, PC users and communications professionals. We're advertising all our services to numerous diverse groups. And we're reaching them all through Computerworld.

"The results we've seen confirm this. Computerworld has been our primary vehicle for three and a half years. In fact, it's to the point

now where we reevaluate all our advertising vehicles every year — all but Computerworld. That's one that's never in question.

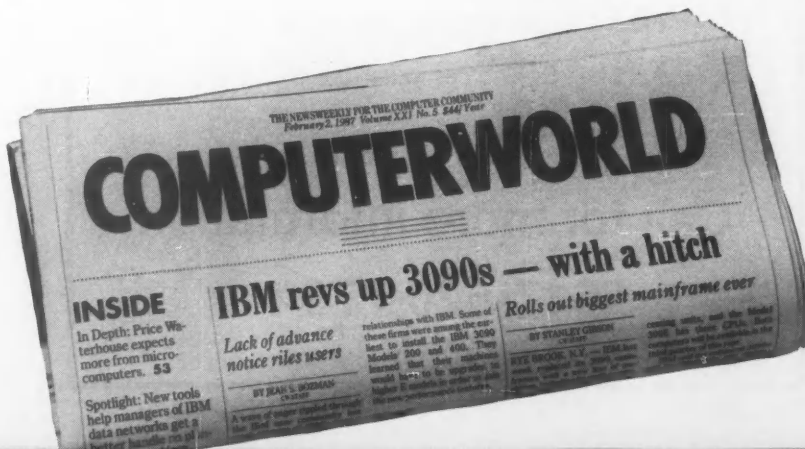
"We're very pleased with Computerworld. Every time we run an Apple campaign, for example, the phones ring off the hook. It's wonderful."

Computerworld. We're helping more suppliers reach more customers more often in the information systems market. Every week. We're working for Leasametric, and we can work for you. For all the facts, call your local Computerworld sales representative.

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**BOSTON:** Northern Regional Manager/David Peterson, District Manager/Dill Caddell, Sherry Driscoll, Account Manager/John Watts, Sales Assistant/Alice Longley, COMPUTERWORLD, 375 Coochituate Road, Box 9171, Framingham, MA 01701-9171 (617) 879-0700

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## CW PUBLISHING/INC.

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**VICE PRESIDENT/Associate Publisher, Vai Landi**

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## FOREIGN EDITORIAL/SALES OFFICES

**Argentina:** Ruben Argente, CG Communications S/A, Av. Argentina 406-Piso 5, CP 1070 Buenos Aires, Phone: (011) 54 134-5583, Telex: (350) 22644 (BAZAR AR).

**Ale:** S.W. Chen, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong, Phone: (011) 852 5 861 3236, Telex: (780) 72827 (COWHONG HK).

**Australia:** Alan Rower, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065, Phone: (011) 61 2 4399133, Telex: (790) AA74752 (COWHOG).

**Austria:** Manfred Weiss, CW Publikationen Verlagsgesellschaft m.b.H., Zieglerstrasse 1, A-1070 Vienna, Austria, Phone: (011) 43-222-930500, Telex: (847) 115 542 (SCH/A).

**Brazil:** Ney Kruel, Computerworld do Brasil, Rua Alcindo Guanabara, 25-11 andar, 20.031 Rio de Janeiro, RJ Brazil, Phone: (011) 55 21 240 6225, Telex: (391) 21 30638.

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**Hungary:** Dezso Futacs, Computerworld Informatica Co. Ltd., H-1536 Budapest, Pf. 396, Hungary, Phone: (011) 36 1 228 458, Telex: (861) 22 6307 (CWI H).

**Italy:** Jean-Louis Redon, Computer Publishing Group S.R.L., Via Vida 7, 20127 Milano, Italy, Phone: (011) 39-2 2613432, Telex: (843) 335318.

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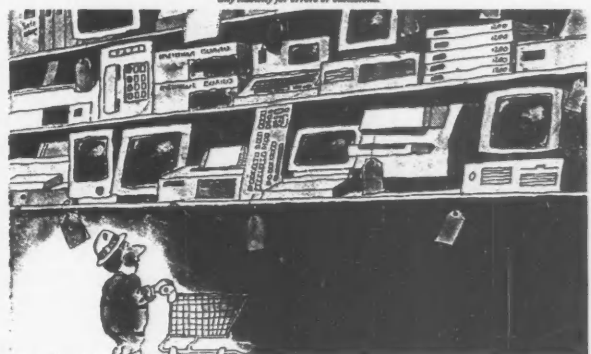
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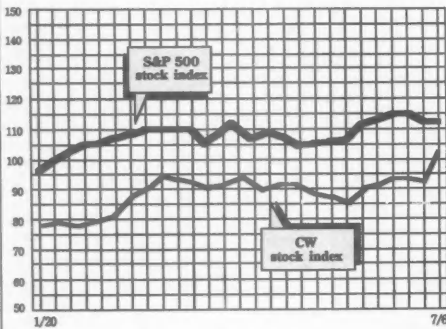
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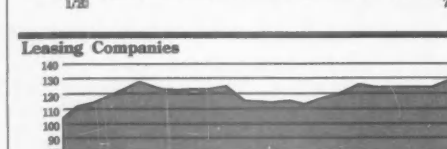
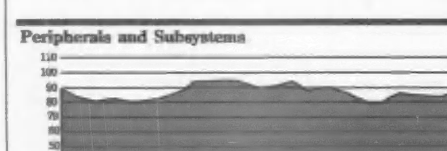
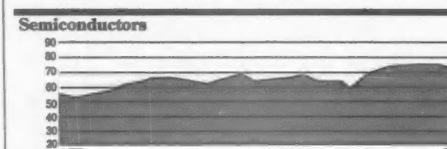
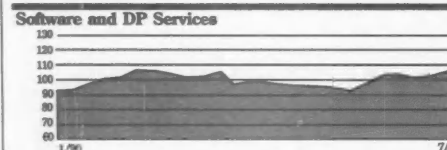
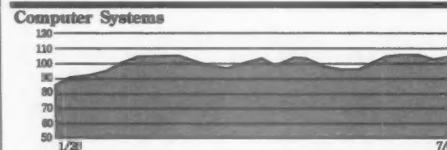
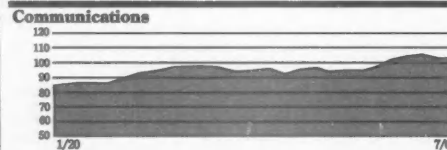
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Aug. 8	IBM Midrange Software (System 3/X)	July 22
Aug. 29	DB2 Market	Aug. 12
Sept. 19	Hardware Roundup: Large, Medium Scale and Special Purpose Systems	Sept. 2
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Oct. 17	AI/Expert Systems	Sept. 30
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Nov. 14	TBA	Oct. 28
Dec. 5	LAN's	Nov. 19
Dec. 19	IBM-Compatible PCs/PS2 Market Products/Monitors	Dec. 2

# STOCK TRADING INDEX



Indexes	Last Week	This Week
Communications	103.5	103.6
Computer Systems	103.8	104.4
Software & DP Services	103.3	106.1
Semiconductors	75.0	72.9
Peripherals & Subsystems	84.4	86.1
Leasing Companies	124.0	130.3
Composite Index	93.8	102.2
S&P 500 Index	113.5	113.9



## Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 6, 1988

EXCH	52-WK RANGE	PRICE JULY 6, 1988	WEEK NET CHANGE	WEEK PCT CHANGE
<b>Communications and Network Services</b>				
N AMERICAN INFO TECHS CORP	100 74	90.63	0.5	0.6
N ANDREW CORP	18 11	17.00	0.5	3.0
N ARTEL COMM CORP	3 1	2.75	0.0	0.0
N AT&T	36 20	26.75	0.3	0.9
N AVANT GARDE COMP INC	6 2	1.88	-0.1	-5.3
N AWANTER INC	16 6	7.00	0.1	1.8
N AYON CORP	35 16	20.00	0.0	0.0
N BELL ATLANTIC CORP	80 61	70.75	0.1	0.2
N BELL SOUTH CORP	44 29	41.63	-1.1	-2.6
N COMPRESSION LABS INC	6 2	4.50	0.0	0.0
N COMPUTER NETWORK TECH	5 1	2.26	0.0	1.5
N CONTEL CORP	40 25	34.50	0.1	0.4
N DATA SWITCH CORP	10 4	8.00	0.1	1.6
N DIGITAL COMM ASSOC	46 20	36.88	-0.5	-1.3
N DYNATECH CORP	32 14	22.50	0.5	2.3
N FIBRONICS INTERNATIONAL	7 2	3.75	0.0	0.0
N GANDALF TECHNOLOGIES	8 5	7.13	0.1	1.8
N GENERAL DATACOM INDS	10 3	3.50	0.1	3.7
N GTE CORP	38 13	38.13	-0.2	-0.5
N INFOTRON SYS CORP	14 5	12.75	0.0	0.0
N ITT CORP	66 42	52.25	1.3	2.5
N M&A CORP	16 7	10.50	0.1	1.2
N MCI COMMUNICATIONS CORP	15 7	15.00	1.1	8.1
N NCOM SYS INC	17 7	15.50	0.0	0.0
N NETWORK EQUIPMENT TECH INC	28 12	20.88	0.9	4.4
N NETWORK SYS CORP	13 7	11.00	-0.6	-5.4
N NORTHERN TELECOM LTD	14 8	18.38	0.0	1.5
N NOVELL INC	30 12	28.25	-0.3	-0.9
N NYNEX CORP	78 58	65.63	-1.0	-1.5
N PACIFIC TELECOM GROUP	34 28	28.50	-0.5	-1.8
N PARADYNE CORP	9 4	5.38	-0.9	-14.0
N PENRIL CORP	5 1	4.25	-0.5	-10.5
N PLESSEY PLC	26 13	26.25	0.0	0.0
N SCIENTIFIC ATLANTA INC	20 8	15.25	1.5	10.9
N SOUTHWESTERN BELL CORP	46 22	37.63	-1.5	-3.8
N 3 COM CORP	12 6	12.4	-0.1	-0.8
N UNGERMANN BASS INC	15 5	12.31	0.0	0.0
N US WEST INC	60 43	56.50	0.9	1.6

EXCH	52-WK RANGE	PRICE JULY 6, 1988	WEEK NET CHANGE	WEEK PCT CHANGE
<b>Computer Systems</b>				
N ALLIANT COMPUTER SYS	23 5	6.00	-0.5	-7.7
N ALPHA MICROSYSTEMS	7 3	6.44	0.4	7.3
N ALTOS COMPUTER SYS	15 9	9.63	0.5	5.5
N AMDAH CORP	56 19	53.00	-0.6	-1.2
N APOLLO COMPUTER INC	23 9	15.25	0.1	0.8
N APPLE COMPUTER INC	80 28	46.50	-0.2	-0.4
N BOLT BERANEK & NEWMAN	25 12	16.75	-0.3	-1.5
N BRITTON LEE INC	4 1	2.50	0.1	5.3
N COMPAC COMPUTER CORP	79 34	64.50	0.9	1.4
N COMPUTER AUTOMATION INC	16 6	7.00	0.0	0.0
N COMPUTER CONSOLES INC	9 2	8.75	0.0	0.0
N CONCURRENT COMP CORP	24 11	17.00	0.3	1.8
N CONTROL DATA CORP DEL	38 18	27.00	0.5	1.9
N CONVERGENT TECH	9 3	3.08	0.0	0.0
N CONVEY COMPUTER CORP	17 6	8.13	-0.1	-1.3
N CRAY RESH INC	119 47	84.63	0.9	1.0
N DASH SYS CORP	12 5	10.50	-0.4	-3.4
N DATA GEN CORP	37 16	22.00	0.0	0.0
N DATAPONT CORP	9 3	5.00	0.0	0.0
N DIGITAL EQUIP CORP	200 99	114.88	0.5	0.4
N FLOATING POINT SYS INC	12 3	2.88	-0.1	-3.3
N GOULD INC	34 8	15.75	-0.8	-4.5
N HARRIS CORP	41 22	29.00	0.0	0.0
N HEWLETT PACKARD CO	74 36	83.68	-0.9	-1.0
N HONEYWELL INC	91 49	69.25	0.3	0.4
N IBM	176 102	126.88	-0.1	-0.1
N INFORMATION INTL INC	15 9	15.00	1.0	7.1
N IPL SYS INC	3 1	2.25	0.1	5.9
N MASS COMPUTER CORP	14 4	3.75	0.0	0.0
N MATSUSHITA ELEC IND LTD	228 103	193.00	0.0	0.0
N MEGADATA CORP	6 2	2.75	0.0	0.0
N MENTOR GRAPHICS CORP	39 14	35.75	1.5	4.4
N NBI INC	14 1	4.25	-0.1	-2.8
N NCR CORP	87 50	63.25	-1.9	-2.9
N PRIME COMPUTER INC	31 12	15.88	0.4	2.4
N PYRAMID TECHNOLOGY	16 5	15.25	0.5	3.4
N STRATUS COMPUTER	35 15	28.25	-1.0	-3.4
N SUN MICROSYSTEM INC	44 14	39.75	2.5	6.7
N SYMBOLICS INC	5 1	1.25	0.1	8.0
N SEQUENT COMPUTER SYS	20 9	17.75	0.6	3.6
N TANDEM COMPUTERS INC	37 15	20.25	0.1	0.6
N TANDY CORP	57 28	44.88	-2.5	-5.3
N ULTIMATE CORP	37 12	13.25	0.0	0.0
N UNISYS CORP	48 24	26.25	0.8	2.1
N WANG LABS INC	19 10	10.63	-0.3	-2.3

EXCH	52-WK RANGE	PRICE JULY 6, 1988	WEEK NET CHANGE	WEEK PCT CHANGE
<b>Software &amp; DP Services</b>				
N ADVANCED COMP TECH	6 1	1.34	0.2	13.1
N AGS COMPUTERS INC	30 11	26.75	-0.4	-1.4
N AMERICAN MGMT SYS INC	20 9	16.75	1.0	6.3
N AMERICAN SOFTWARE INC	19 6	13.88	-0.1	-0.9
N ANACOMP INC	12 4	10.88	-0.3	-2.2
N ANALYSTS INTL CORP	8 0	8.00	0.0	0.0
N ASHTON TATE	33 13	24.75	-1.3	-4.8
N ASK COMPUTER SYS INC	16 6	14.88	0.1	0.8
N AUTODESK INC	34 12	29.25	1.0	3.5
N AUTO DATA PROCESSING	55 16	40.00	0.3	0.6
N BOOLE & BARBAGE INC	12 5	9.25	0.3	2.8
N COMPUTER ASSOC INTL INC	27 15	29.13	1.1	3.5
N COMPUTER HORIZONS CORP	15 7	11.00	0.5	4.8
N COMPUTER SCIENCES CORP	73 38	43.38	-0.3	-0.6
N COMPUTER TASK GROUP INC	16 9	13.00	0.1	0.8
N COGNOS INC	17 4	5.99	0.3	5.8
N COMSHARE INC	27 12	21.00	1.5	7.7
N CULLINET SOFTWARE INC	14 4	8.13	-0.1	-1.2
N DUQUESNE SYS INC	22 10	18.75	-0.5	-2.6
N DATA ARCHITECTS INC	16 7	13.75	0.0	0.0
N GENERAL MTRS (CLS E)	51 30	38.88	1.0	2.6
N HOGAN SYS INC	14 3	4.50	0.6	16.1
N INFORMIX CORP	31 12	24.00	0.5	2.1
N INTELICORP INC	8 2	3.50	0.1	3.0
N KEANE INC	16 6	11.25	0.8	7.1
N LOTUS DEV CORP	40 19	23.75	0.4	1.6
N MANAGEMENT SCI AMER	14 6	12.88	1.5	13.2
N MICRO PRO INTL CORP	7 2	2.69	0.1	4.9
N MICROSOFT CORP	70 37	68.75	3.0	4.6
N MORINO ASSOCIATES INC	20 7	19.19	1.1	5.9
N NATIONAL DATA CORP	34 20	23.00	-0.3	-1.1
N ORION SOFTWARE INTL INC	22 6	6.38	-0.3	-3.8
N ORACLE SYS CORP	21 8	20.75	0.6	3.1
N PARSOPHC INC	28 11	16.25	1.3	8.3
N POLICY MGMT SYS CORP	30 15	24.00	-0.8	-3.0
N PROGRAMMING & SYS INC	14 7	11.50	0.0	0.0
N REYNOLDS & REYNOLDS CO	38 14	18.75	0.5	2.7
N SEI CORP	22 10	20.50	-0.8	-3.5
N SHARED MED SYS CORP	30 19	22.00	0.1	0.6
N SAGE SOFTWARE INC	15 5	6.63	0.8	12.8
N SOFTWARE PLUG CORP	25 5	24.63	1.9	8.2
N STERLING SOFTWARE INC	12 6	6.88	0.3	3.8
N SUNGARD DATA SYS INC	20 10	18.75	0.0	0.0

N SYSTEMATICS INC	34 19	33.25	0.5	1.5
N SYS SOFT INC	24 7	7.20	-0.5	-2.5
N VM SOFTWARE INC	24 7	15.75	-0.3	-1.6

### Semiconductors

N ADV MICRO DEVICES INC	25 8	16.00	-0.3	-1.5
N ANALOG DEVICES INC	24 8	15.13	0.3	1.7
N ANALOGIC CORP	13 5	7.50	-0.4	-4.8
N INTEL CORP	42 18	35.13	-1.1	-3.1
N LSI LOGIC CORP	15 7	12.75	0.0	0.0
N MOTOROLA INC	74 35	92.25	-1.8	-3.2
N NATL SEMICONDUCTOR	22 10	12.25	-2.1	-14.8
N TEXAS INSTRS INC	80 36	48.63	-0.6	-1.3
N WESTERN DIGITAL CORP	30 11	15.13	-0.1	-0.8

### Peripherals

N ALLOY COMP.	13 2	2.31	-0.1	-2.6
N AMINTL INC	9 3	5.25	0.1	2.4
N AMSTRON SYS CORP	21 6	10.25	-0.1	-1.2
N AUTO TROL TECH CORP	7 3	4.88	-0.3	-4.9
N BANCTEC INC	14 5	8.00	0.1	1.6
N EMULEX CORP	29 6	3.50	0.6	10.8
N COGNITRONICS CORP	5 2	2.88	-0.1	-2.1
N COMPUGRAPHIC CORP	28 19	26.88	0.0	0.0
N DATA PRODUCTS CORP	24 7	10.25	-0.1	-1.2
N DATARAM CORP	6 5	6.88	-0.5	-6.8
N EASTMAN KODAK CO	71 39	45.50	1.0	2.2
N E M C CORP MASS	23 6	6.50	0.0	0.0
N EMULEX CORP	9 4	7.25	0.3	3.6
N EVANS & SUTHERLAND	35 14	15.75	0.8	5.0
N ICOT CORP	8 3	3.63	0.0	0.0
N INTERLEAF INC	24 11	11.88	-0.5	-4.0
N IOMEGA CORP	5 1	4.63	0.4	10.4
N LEE DATA CORP	6 3	3.25	0.0	0.0
N MAXTOR SYS CORP	6 1	2.25	0.1	2.8
N MAXTOR CORP	19 6	11.63	-0.4	-3.1
N MICROPOLIS CORP	40 13	18.00	0.3	1.4
N MINISCRIE CORP	17 5	13.00	0.9	7.2
N MINNESOTA MNG & MFG CO	84 45	65.25	-0.4	-0.6
N MSI DATA CORP	19 8	13.50	-1.3	-8.5
<b>PERSONAL COMPUTER</b>				
N PRODUCTS INC	7 4	5.25	0.0	0.0
N PRAM CORP	5 1	1.63	-0.3	-13.3
N TROMB INC	17 7	10.25	0.3	2.5
N QMS INC	27 8	8.75	0.3	2.9
N QUANTUM CORP	19 8	11.25	0.3	2.3
N XEROX CORP	6 1	0.94	-0.1	-11.6
N RECOGNITION EQUIP INC	21 6	8.13	-0.1	-1.5
N REXON INC	11 4	17.75	-0.1	-1.8
N SCAN TECH CORP	17 7	15.50	0.0	0.0
N SEAGATE TECHNOLOGY	33 10	17.88	0.0	0.0
N STORAGE TECH CORP	4 1	2.88	1.0	53.3
N TANDON CORP	6 1	2.31	0.1	3.8
N TEC INC	6 3	3.50	0.0	0.0
N TEKTRONIX INC	41 21	25.50	0.1	0.5
N TELEVIDEO SYS INC	17 7	11.19	0.0	0.0
N TELEX CORP	75 30	49.00	0.0	0.0
N WYSE TECH	40 11	21.75	1.4	6.7
N XIDEX CORP	15 5	6.25	0.8	13.6

### Leasing Companies

N CAPITAL ASSOCIATES INTER-NATIONAL INC	6 3	5.25	0.4	7.7
N COMSCO INC	10 4	6.88	0.3	3.8
N CONTINENTAL INFO SYS	37 12	24.13	-0.1	-0.5
N PHOENIX AMER INC	13 5	6.63	-0.6	-10.5
N SELECTERM INC	5 2	3.25	0.1	4.0

EXCH: N=NEW YORK; A=AMERICAN; Q=NASDAQ; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID (1) TO NEAREST DOLLAR

## Hogwash

The Street displays fireworks that turn out to be duds

The Dow Jones industrial average did an admirable job of imitating Independence Day fireworks, exploding brightly early in the week when the average hit a post-crash high of 2,158.61 but fizzling and sinking slowly as the four-day business week drew on. Apollo Computer, Inc. was the hardest hit major computer issue; its stock sank more than 30% for the week after the firm announced a projected second-quarter loss and finished Thursday's market close down 3% points to 10% (see story page 4).

Other sliders included NCR Corp., down 2% points to 62%; Tandy Corp., dropping two points to 45% after the investment house of Dean Witter Reynolds, Inc. lowered its rating on the firm; Amdahl Corp., down 1½ points to 51½; Novell, Inc., off 1½ points to 27%; Compaq Computer Corp., down 1½ points to 63%; Ashton-Tate Corp., off one point to 25; and Control Data Corp., down ¾ of a point to 26½. Winners included Cray Research, Inc., up 1½ points to 85½; IBM, up one point to 127½; Microsoft Corp., rising ¼ of a point to 68½; Digital Equipment Corp., up ½ a point to 114½; and Hewlett-Packard Co., up ¼ of a point to 55½.

JAMES DALY

# Wheeling and dealing on PCs

*Buyers indulge in discounts as vendors, dealers feel pressure*

BY ALAN J. RYAN  
CW STAFF

If you're paying list prices for personal computers these days, save yourself some embarrassment and keep that information to yourself.

Standard discounts from vendors and the pressure for dealers to compete with direct sales are giving buyers the upper hand. When they have time enough to be choosy, their attitude is often, "Big discounts, or the deal is off."

According to buyers interviewed last week who all place orders for 100 or more microcomputers annually, discounts are no longer an infrequent and unexpected luxury.

Some buyers said they work directly with several vendors to obtain the lowest price for comparable technology without having to deal with the middleman

retailer. All agreed that rarely, if ever, would they pay full retail price for any hardware.

Figuring in a standard 34% discount, IBM's \$7,995 Personal System/2 Model 70-121 would be available to many buyers for \$5,277, and the \$2,139 PS/2 Model 25-L01 would sell for slightly more than \$1,400.

## Cutting deals

While the discounts buyers receive generally vary from 26% to 35% at most of the companies contacted, some said they prefer fixed rates over variable ones. One buyer said, "We try to find a dealer who will give us a flat discount across all of the hardware rather than working out discounts on a piece-by-piece basis." The added stability makes it easier to predict computer budgeting.

At times, according to a buyer in the company headquarters of a

large Midwestern Fortune 100 corporation, buyers negotiate such large discounts that some vendors back out because the profit margins are too low. But with his company buying more than 200 PCs monthly, he said most vendors find it hard to say no, even when his company requests 40% discounts.

To qualify for high discounts, a computing manager at an East Coast financial institution said his company must place orders for more than 1,500 computers annually. Through a deal with IBM, he said, he receives a 34% discount.

Not surprisingly, the larger the vendor is, the larger the discount is likely to be. Although some companies can negotiate percentage discounts with IBM that range from the high 20s to mid-30s, some smaller vendors offer almost no price break at all.

For example, one company

contacted said it is buying Dell Computer Corp. PCs. While the corporate discount is very small at just 5%, he said, "one advantage is that they will ship Amdek monitors with the computers for us," which Dell does not normally do. And, according to another manager who is also considering Dell, the computers are lower priced than their competition to begin with.

Many large companies that are unable to commit to buying large quantities of computers annually — and those that buy as fluctuating demand is generated — funnel their buying dollars through local retailers and are offered significant discounts for doing so. Most said discounts ranged from 26% to 37%.

## First dibs

Cheryl Currid, manager of departmental computing at Coca-Cola Foods in Houston, said her company's microcomputer purchase orders are first offered to the local dealer that offers the biggest discounts.

But because her users often need the machines right away,

she said she is sometimes forced to buy from other dealers that do not offer such attractive discounts. When buying one model of Compaq Computer Corp.'s Deskpro 386, she said she has seen as much as a \$400-per-PC difference in prices through local retailers.

At Heller Financial, Inc. in Chicago, Charles Mallet, senior vice-president of information management, said his firm typically receives 26% to 35% discounts on hardware through the local branches of two national retail chains. "We deal where we get the best buy," he said of his company's annual purchases of some 100 to 200 IBM PS/2s and Compaq and Toshiba Corp. PCs.

As with many other buyers, Heller negotiates for the entire computer package in its dealings with retailers, Mallet said.

A spokesman at Entre Computer Centers, Inc. in McLean, Va., said the discount percentages offered can vary widely but that most range in the 30s. "The discounts are negotiated between the individual centers and the clients," he said.

## Fracas

FROM PAGE 1

potential reversal in today's market, in which Dbase has held a near monopoly for the last several years. Up until now, firms hawking what some call better products battled for the crumbs brushed aside after Ashton-Tate's feast.

Clearly, this is a war that has yet to really begin. In fact, Ashton-Tate's share of the retail market has increased in the past year, according to IMS America Ltd. However, a recent Focus Research, Inc. survey of large corporations found that plans to buy Dbase are off noticeably (see chart page 1).

## Thank Codd

But the evolution of PC DBMS technology, much of which has a clear mainframe heritage, has ushered a host of new and potentially successful players into the market. Many of these players offer products that would tickle the fancy of the infamous Edgar

Codd, who, along with IBM, made SQL and adherence to Codd's so-called relational model a prerequisite for success in the DBMS market.

The strides SQL has made even forced Ashton-Tate to scramble for partners such as Sybase, which provides the SQL Server that Ashton-Tate will market, and Wordtech Systems, Inc., which sold SQL language technology to Ashton-Tate and provided a nearly complete development team.

The user community, which has struggled to understand what SQL is and what it does, appears ready to make some decisions.

Some have already decided what product will replace Dbase. Earl Mott, manager of advanced manufacturing and engineering systems at Haworth, Inc., is moving his users from Dbase to Oracle on PCs and is now training people in SQL programming.

For others, the decision will take longer. Whirlpool Corp. will choose its future PC DBMS platform based on how well it fits

## The data base joust

*Ashton-Tate's and Oracle's days are numbered as the sole major vendors offering PC-based data base management system products*

Company	Offerings	
	Current	Future
Ashton-Tate	Dbase III Plus; no SQL support; limited network support	SQL; client/server architecture support tying Dbase IV to Sybase SQL Server
Lotus	None	SQL; client/server support tying Lotus's 1-2-3/G and other tools to Gupta Server
Microsoft	None	Sybase SQL Server marketed through OEMs; a single-user DBMS tied to SQL Server
Oracle	Professional Oracle; Oracle for 1-2-3; LAN Server Oracle for Xenix-based servers	An OS/2 server product; a Dbase clone interfacing to current DBMS products
IBM	None	OS/2 Extended Edition Data Manager, a single-user DBMS that uses SQL patterned after DB2; a server version of OS/2 Extended Edition

CW CHART

with all levels of systems and fulfills the drive toward distributed data bases, said Robert Metz, senior technical analyst for the appliance maker. It may take as long as two years, however, to choose a supplier. "We are still not super-firm on our mainframe

data base," Metz said.

Despite the infusion of new and innovative competitors, many remain Dbase diehards.

"The only thing I see is SQL being added to the Dbase language," said Adam Green, a teacher of Dbase at Digital Consulting, Inc. in Andover, Mass. But for Green, it is the Dbase language and not necessarily the Ashton-Tate product that will continue to prevail.

## Sticking with Dbase

Some users agree with Green. "I am expecting that Dbase IV will satisfy our needs," said R. Bruce Johnson, manager of the PC Resource Center at Deloitte Haskins & Sells. "I have heard no rumblings about deserting the Dbase standard."

Touche Ross & Co., traditionally a Dbase shop, said it is undecided as to its next move. The firm will consider a variety of

client/server style products before a decision is reached, but Dbase IV is clearly still in the running.

"You ignore the market leader at your own peril," said G. Jeffrey Knepper, director of advanced technology-tax at the Big Eight accounting firm.

Ashton-Tate itself is holding firm, confident that its embrace of SQL will keep competitors away from the heart of the market. "Dbase IV is absolutely the right product," said Roy Folk, Ashton-Tate executive vice-president.

Ironically for many shops, mainframe software accessed via PCs is the best alternative to PC DBMS products.

"Everyone is tied into the mainframe, and they tend to use that," said C. Thomas Hendrix, manager of information services at the Aluminum Company of America, or Alcoa.

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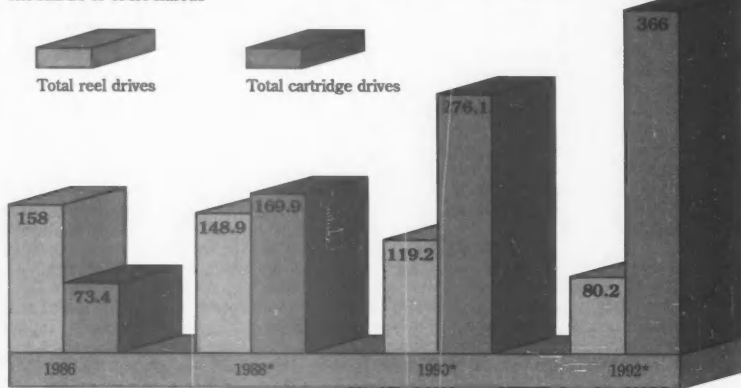


## TRENDS

## Tape storage

## Cartridge tape drives come from behind to outstrip reel-to-reel

THOUSANDS OF UNITS SHIPPED



\* Projected

They seem like ancient technology, but reel-to-reel tape drives are so entrenched that their replacement by cartridge drives has been less than revolutionary. Half-inch cartridges will overtake reel-to-reel this year — but just barely, according to Freeman Associates, Inc.

Cartridge shipments will increase steadily into the early 1990s. In 1992, Freeman predicted, 4½ times as many cartridges as reel tapes will ship.

"A lot of users are locked up into reel drives," Freeman Vice-President Bob Abraham said. He added that it is "such a slow, painful process" to convert information from one medium to the other that most MIS managers will store newer information on cartridge drives and wait until the information on the reel-to-reel drives becomes obsolete.

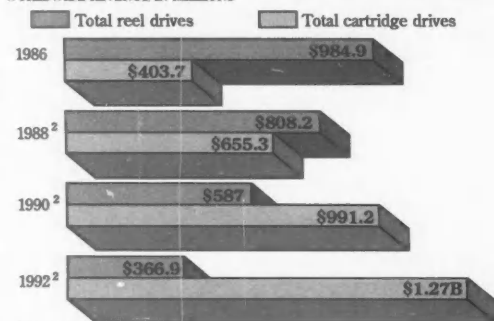
While revenues from reel-to-reel drives are slightly greater than those of cartridges this year — \$808 million compared with \$655 million — cartridge revenues will outstrip reel tape revenues by \$400 million in 1990 and by \$1 billion in 1992, the firm forecast.

Cartridge drives on the low end of the market — those with data transfer rates lower than 1.5M byte/sec. — currently account for three times the sales of faster drives. Sales will continue to grow, Freeman said, and the low-end drives will account for more than four times as many shipments as the high-end cartridges.

There are practically no cartridge offerings in the mid-range, Abraham noted.

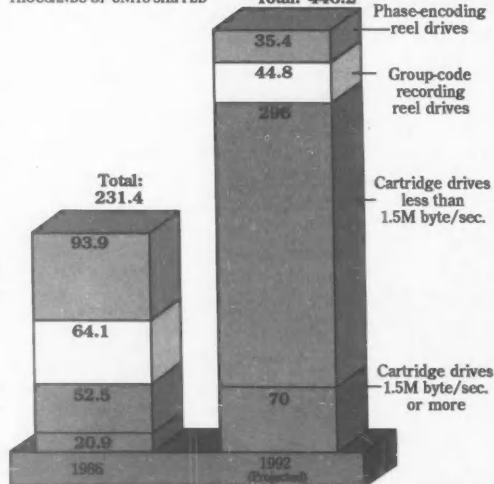
J. A. SAVAGE

## Reel dollars dive; cartridges make splash

WORLDWIDE REVENUE IN MILLIONS<sup>1</sup><sup>1</sup> At OEM subsystem price level<sup>2</sup> Projected

## Low-end cartridges are fastest growers

THOUSANDS OF UNITS SHIPPED

INFORMATION PROVIDED BY FREEMAN ASSOCIATES, INC.  
CW CHARTS

## INSIDE LINES

**Time for this transaction.** DEC will reportedly make its support of the debit-credit benchmark a centerpiece of its on-line transaction processing announcement in New York July 19. DEC could make public debit-credit benchmarking results of a number of machines from different vendors, including Tandem and IBM. At the rollout, DEC is expected to announce its Decintact transaction processing software, along with enhancements to its relational data base product, RDB. Also coming could be a data base server carrying the name of Vaxlink.

**Too big a RISC?** Industry scuttlebutt about DEC shelving R&D projects continued last week with speculation that the company has killed its so-called Prism project, a 64-bit reduced instruction set computing (RISC)-based system, and Microprism, a 32-bit RISC system. Instead, according to industry sources, DEC will replace those efforts with an OEM agreement with Mips Computer Systems in Sunnyvale, Calif. Mips recently announced the M/2000 Riscocomputer, which uses its R3000 chip set and is said to be capable of sustained performance of 20 MIPS. The M/2000 runs Mips' RISC/OS, a version of the Unix operating system. A Mips spokesman said Mips has not entered into an OEM agreement with DEC.

**Channel blocked up.** The first microcomputer compatible with IBM's PS/2 has been delayed. Officials at Tandy said its Intel 80386-based Tandy 5000 MC will ship in one week — 10 to 15 days later than originally scheduled. Ed Juge, Tandy's director of product development, said shipment delays of "major components" caused the slips in the schedule.

**Buy petroleum stocks?** The savvy exec in *The Graduate* isn't the only one who knows that the future is in plastic. Texas Instruments, the cowboys who supply token-ring chip sets to the non-IBM token-ring vendors out there, recently announced plastic packaging for that component. OK, so maybe the news doesn't exactly knock your socks off, but consider this: The plastic makes for a cheaper chip set, cutting costs by 10% to 25%, which in turn reduces the cost of token-ring network adapters. As the cost of Ethernet cards continues to plummet, that could slow the rise of token-ring installations — unless, of course, the cost of token-ring cards begins to fall as well.

**R-2-me-too!** President Reagan may worry about "Star Wars," but Tandem CEO Jim Treigby says his firm has its own problem: "E-Mail Wars" among employees. "People would kill for it — they believe in E-mail," he says. "Someone takes a stand on an issue that's political, then you develop a battle between opposing views." Treigby says Tandem has done its best to refocus its electronic mail addicts back to designing and selling transaction processing computers but E-mail wars still break out "maybe once a year."

**Untying the knots.** IBM informed key figures three months ago that it is preparing the first of a five-stage introduction of distributed data base products. The announcement was slated to occur at the same time as delivery of the PS/2's Extended Edition operating system. With Extended Edition's built-in relational data base manager, IBM would finally be in a position to tie its mainframe DB2 and SQL/DS DBMS to the personal computer. That's still IBM's aim, but now the sources say the distributed products announcement has been delayed until mid-fall.

**With the aim of ridding fungus among us, seven vendors of antiviral software recently announced they have formed a group to provide guidelines for the development and marketing of antiviral measures. The Computer Virus Industry Association's purpose is to limit the spread of misinformation and distribution of ineffective products. If we need protection from software that is supposed to protect us from software viruses, maybe it's time we brought in The Exorcist. Anybody with evidence of flim-flam antiviral products is urged to contact the hot line at 800-343-6474 or 617-879-0700 so News Editor Pete Bartolik can advise the rest of the computer world on inoculation procedures.**



# OUR NEW PRINTERS MAKE EVEN BAD WRITING LOOK GOOD.

## CHAPTER ONE THE BLACKEST HOUR IS MIDNIGHT

It was not a night fit for man or beast what with the sky being as black as ink and it starting to rain like cats and dogs. As if things weren't bad enough Jeffrey Whipple had to climb all the way up to the top of Bald Eagle hill in his snakeskin boots so new their smell reminded him of a car he once leased in Flagstaff, Arizona just to check things out because earlier in the day a message had gotten through that there was going to be trouble this night so he was feeling ominous as the dry wind whipped up the dust around his feet and wondering if he should go on or go back to camp when suddenly, he heard a twig crack behind him or thought he did but as he turned he ... it was anything except the black bleakness of the

We're sorry that our new 24-wire Pinwriter® P5200 and P5300 printers can't do much for the quality of your writing. But they can certainly do wonders for the way it looks. The secret is the ribbon. Other dot matrix printers only use a fabric ribbon. Our Pinwriters print with both a fabric and a letter-quality, multi-strike film ribbon—the same kind used on executive typewriters.

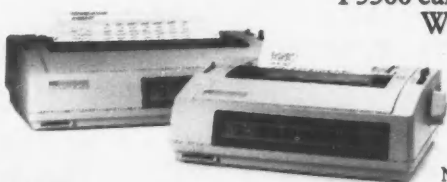
The NEC Pinwriters can also enhance your writing in other ways. They have seven resident type styles. Plus four more are available on plug-in font cards. Which means you can express your thoughts with just the right typeface. You can also get an inexpensive, user-installed color option. And if graphics are part of your story, these Pinwriters produce the highest resolution of any printer you can buy.

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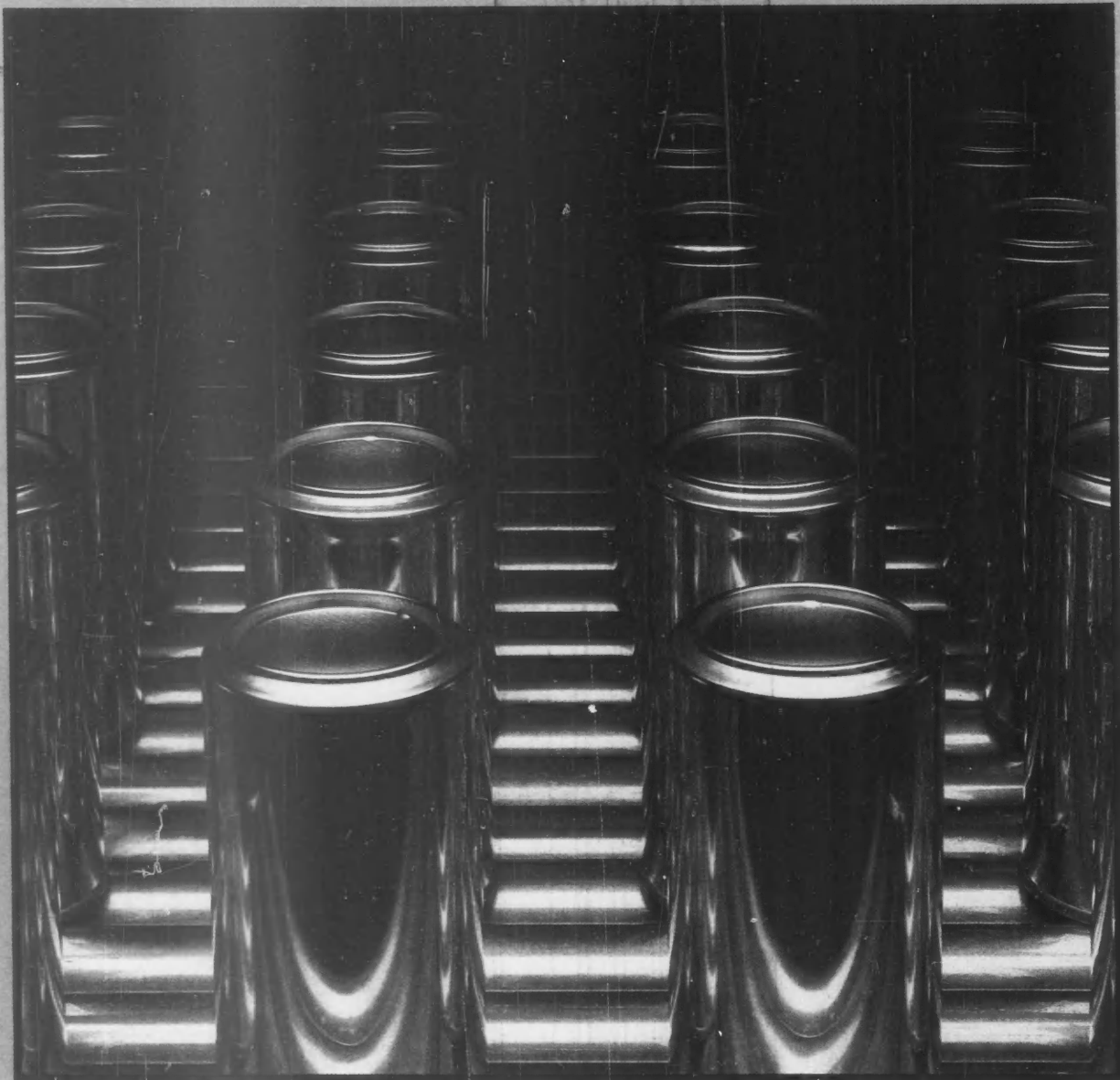
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